DOCUMENT RESUME

ED 053 174 TM 000 701

AUTHOR	Bernabei, Raymond, Comp.
TITLE	Behavioral Objectives: An Annotated Resource File.
INSTITUTION	Pennsylvania State Dept. of Public Instruction, Harrisburg. Bureau of Curriculum Planning and School Evaluation.
PUB DATE	May 71
NOTE	49p.
EDRS PRICE	EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS	*Annotated Bibliographies, *Behavioral Objectives, *Behavioral Sciences, Bibliographic Citations, *Bibliographies, Educational Objectives, Literature Reviews, *Reference Materials, School Personnel

ABSTRACT

This file contains research studies, conference papers, and other documents on behavioral objectives. By using this information, instructional personnel may be able to provide more precise guidance in identifying, analyzing, constructing and using behavioral objectives. (CK)

ED053174

Behavioral Objectives

An Annotated Resource File

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

DEPARTMENT OF PUBLIC INSTRUCTION

Bureau of Curriculum Development and Evaluation

Commonwealth of Pennsylvania • Harrisburg

EM 000 701

ED053174

BEHAVIORAL OBJECTIVES

An Annotated Resource File

Compiled & Produced
By

DR. RAYMOND BERNABEI
Assistant County Superintendent
Division of Curriculum & Instruction
Bucks County Public Schools
Doylestown, Pennsylvania

PREFACE

Within the past few years, the concept of behaviorally stated objectives in instruction has received much attention. Stating instructional objectives in terms of observable behaviors expected of students upon completion of instruction has been a concern of educators for many years. There seems to exist a need for communications among educators working with behaviorally stated objectives. To help meet this need, a systematic search for publications and unpublished reports was made.

A careful study of this annotated resource file, containing research studies, conference papers and other documents on behavioral objectives is worth investigating. It is intended that through the use of this document, instructional personnel may be able to provide more precise guidance in identifying, analyzing, constructing and using behavioral objectives.

R. B.

A note of appreciation . . .

The author gratefully acknowledges the time, energy and invaluable assistance provided by Raymond Lee Bernabei, William Chepla and Robert Piatt in the preparation of this booklet. Sources of materials on behavioral objectives have been few until recent years. Without the help of these people, this particular assignment would have been a much more formidable task.

Recognition must also be given to Miss Rita Nuss for her fast, accurate typing and efficient proofreading of the materials.

My very special thanks to the personnel in the Pennsylvania Department of Public Instruction, Bureau of Curriculum Development and School Evaluation, for their patient guidance and leadership in promoting such a significant venture.

Dr. Raymond Bernabei

Adler, Irving. "What Shall We Teach in High School Geometry?" The Mathematics Teacher, Vol. LXI, No. 3, Mar. 1968, pp. 226-238.

In this article, the author talks about the nature of geometry and then proceeds to list five goals of high school geometry. He then examines each of these goals separately to see what changes are necessary to bring these goals closer to realization. He answers the question in the title by suggesting some specific changes in the courses now being taught. The five goals include: (1) Exploration of relationships among geometric facts previously learned; (2) Introduction to the role of transformations of space in the study of geometry; (3) Mastery of a variety of techniques; (4) Development of critical thinking; (5) Development of an understanding of the nature of a mathematical model.

Advisory Board on Education: Psychological Research in Education, Publication 643. Washington D.C.: National Academy of Science--National Research Council, 1958, pp. 31.

A summary report of a conference on psychological research in education. The panel reports stressed the need for determining objectives and for analysis of cognitive tasks.

Ahmann, J. Stanley, and Marvin D. Glock. Evaluating Pupil Growth. Boston: Allyn and Bacon, Inc., 1963, 2nd ed.

Ahmann and Glock precede their study of methods of evaluating and improving achievement and learning by presenting educational objectives that play a part in evaluation. Educational objectives are a translation of the needs of youth and are a function of his changing behavior pattern. Part I of this book deals with these educational objectives at all grade levels, while the remaining two parts deal with testing and its various characteristics in relation to objectives. (Chapter 2 relates the process of evaluation to that of formulating educational objectives.)

American Association of School Administrators. Imperatives in Education, Washington, D.C.: American Association of School Administrators, 1966.

In the spring of 1964, the AASA appointed a special commission to identify the major educational objectives or imperatives that must be at the forefront as curriculums are modified, instructional methods revised, and organizational patterns reshaped to meet the needs of this country. They are: (a) To make urban life rewarding and satisfying; (b) To prepare people for the world of work: (c) To discover and nurture creative talent; (d) To strengthen the moral fabric of society; (e) To deal constructively with psychological tensions; (f) To keep democracy working; (g) To make intelligent use of natural resources; (h) To make the best use of leisure time; (i) To work with other peoples of the world for human betterment.

American Council on Education Studies. A Design for General Education, (Dorothy McGrath, Ed.) Washington, D.C.: American Council on Education, 1944.

This was a book written by the American Council on Education. Its contents dealt in part, with the objectives for a program of additional education in the Armed Forces.

It stated the objectives in terms of knowlege and understanding, skills and abilities, and attitudes and appreciation. From these objectives, a course outline was written dealing in the general and specific areas of education which the Council felt was needed by the Armed Forces.

Ammerman, Harry L. Development of Procedures for Deriving Training Objectives for Junior Officers. Alexandria, Virginia: Human Resources Research Office, The George Washington University, 1966.

Research was undertaken to develop a systematic method that could be used by service school personnel to prepare job-oriented training objectives for junior officers, primarily in the form of behavioral statements of student performance expected after training. The procedures developed are divided into four phases: (a) Listing of all tasks for a job; (b) Selecting tasks for some formal training; (c) Identifying the training emphasis needed in the selected tasks; and (d) Specifying the knowledge and skills necessary for the selected training aspects. The procedures included administration of experimental questionnaires, both by personal interview and by mail, reviews of pertinent directives and publications, and visits to field units. As the procedures were developed, they were tried out on a sample officer job (Nike-Hercules Platoon Leaders). In the trial application, a task inventory of 452 items provided the basis for choosing, by use of definite selection rules, 101 job activities (22%) for some formal schooling; of 160 training objectives stated for these activities, 46 were performed-type objectives for which detailed activity descriptions were required. It is believed that use of these procedures by service school personnel to prepare junior officer training objectives is feasible, and that these procedures provide a method for deriving behavioral statements of relevant and essential objectives.

Ammerman, Harry L. "Some Important Ways in Which Performance Objectives Can Vary." Symposium. Alexandria, Virginia: Human Resources Research Office, 1966.

A study of the objectives for 40 courses from eight schools is summarized. Objectives varied in level of specificity of student action, extent to which action is described, completeness, and relevance. Each of these factors is illustrated and discussed. Suggestions are given for promoting objectives to better meet these factors as criteria of useful communicating objectives.

Ammons, Margaret and Robert S. Gilchrist. Assessing and Using Curriculum Content. A Report of the Second National Conference on Curriculum Projects, Chicago, December, 1964. Washington, D.C.: Association for Supervision and Curriculum Development, 1965.

Suggests guidelines for use in school systems in planning and evaluating the use of new curriculum content and materials.

Anthony, Albert. "The Role of Objectives in the 'New History' ". Social Education, Vol. 37, No. 7, November, 1967. pp. 574-580.

A critical look at what factors may have produced the result of not setting up objectives in the "New History" curriculum. It would appear that one factor would be the limited understanding of what objectives are and what their role should be in

curriculum activity. It also appears that Fenton, one of the developers, along with others of the "New History", felt that objectives may be put in anywhere once the program has been developed. Another reason would appear to be that the planning was begun at a frantic pace.

It would appear that many of the objectives of a "new" movement could not be set up until the "needs" of the child or student are recognized. Therefore, Fenton and his colleagues may have not been totally in the wrong as Anthony would lead one to believe.

Atkin, Myron J. "Behavioral Objectives in Curriculum Design: A Cautionary Note." The Science Teacher, Vol. 35, No. 5, May, 1968.

Several reservations about the use of behaviorally stated objectives for curriculum design are presented and discussed in this paper. They are: (a) Progress is being made toward the accomplishment of thousands of goals in any existing educational program; progress of which school personnel are perhaps dimly aware, articulate with great difficulty, and contribute toward goals which are incompletely stated (or unrecognized) but which are often worthy; (b) Certain types of innovation, highly desirable ones, are hampered and frustrated by early demands for behavioral statements of objectives; and (c) It is detrimental to learning not to capitalize on the "opportune moments" for effectively teaching one idea or another. Riveting the teacher's attention to a few behavioral goals provides him with blinders that may limit his range. Also, directing him to hundreds of goals leads to confusing, mechanical pedagogic style and loss of opportunity.

Ausubel, David P. "Crucial Psychological Issues in the Objectives, Organization, and Evaluation of Curriculum Reform Movements". Psychology in the Schools, Vol. IV, No. 2, March, 1967, pp. 111-121.

The first paragraph on page 113 talks about stating objectives in behavioral terms. This particular paragraph takes the side of Atkin in that "such exhortation often does more harm than good." The author then gives reasons for his stand, one of which is the inefficiency and lack of training of most curriculum specialists.

Baker, Robert L. "The Educational Objectives Controversy". Paper read at the Annual American Educational Research Association Meeting, Chicago, February, 1968.

This paper suggests that a set of guidelines for successfully approximating a systematic approach to curriculum development is necessary. The guidelines would be designed to integrate those curriculum specialists who imply that they know what the worthwhile objectives are and have a clear notion as to what kinds of transactions are necessary, and those curriculum specialists who say that because we don't know what the worthwhile objectives are, we should not attempt to specify objectively what it is we are doing. These two extreme positions are discussed in light of the suggested guidelines mentioned above.

Bauchman, Gerald D. "Education for a Continually Changing Environment". Journal of Secondary Education, April, 1968, pp. 156-161.

Part of this article on pp. 156-7 has a great deal to do with educational objectives. The author states that the need for a new kind of man suggests a need for a new kind of

teacher, and the first step in planning for future training of teachers is to reformulate educational objectives in terms of performance needed by the new man. The author then lists six different segments of educational concern which should be integrated into a systematic approach to schooling that constitutes the basis for formulating performance objectives. The author also states that the objective should say what the statement basically means in terms of human behavior. The article also states several implications about the curriculum, instruction, instructional improvement practices, evaluation, teacher education, and recommendations for formal education.

Baughman, Gerald D. and Albert Mayrhofer. "Leadership Training Project: A Final Report." Journal of Secondary Education, Vol. 40, No. 8, 1965, pp. 369-372.

During the first four meetings of the Leadership Training Project, twenty-five people in positions of active responsibility for curriculum design, construction and evaluation studied and discussed the Taxonomy. The next four meetings were conducted by speakers who discussed the implications of the Taxonomy for education. Subsequent meetings included a curriculum theorist's view on the Taxonomy, a discussion of student typologies, curriculum and guidance in reference to the Taxonomy. During the first and last meetings, the participants were asked to list objectives for K-6 Science Program. Of the 64 objectives suggested in the first meeting, only 41 (64%) could be classified according to the Taxonomy categories. In the final meeting the same participants listed 306 objectives with 256 (84%) classifiable according to the Taxonomy. (Taxonomy: See Bloom, Page 5).

Beck, Jacob and William A. Shaw. "Learning and Teaching: An Analysis and Characterization". Psychological Review, Vol. 7, No. 3, December, 1960, pp. 543-553.

A definition of learning tasks in terms of the criterion behavior defined by: (1) The set of discriminative and auxiliary stimuli; (2) Responses required; and (3) Relations between elements of the previous two sets. An analysis was made of task characteristics believed important in facilitating appropriate later behavior in the job situation. An important variable here was the way responses were evoked. Methods for evoking responses, called teaching rules, differ in their ways of determining dependencies between stimuli and responses. Particular learning tasks are analyzed and hypotheses presented for appropriate teaching rules.

Berger, Emanuel. "The Development of an Information System for Elementary School Mathematics Curriculum Materials." Report prepared by the Bureau of Research and the Bureau of General and Academic Education of the Pennsylvania Department of Public Instruction. November, 1967.

This report is a description of an attempt to apply the technology of information storage and retrieval to curriculum materials. The major objective of this study was to design tools to analyze the diverse mathematics materials that reflect recent curriculum innovations. A comprehensive list of 2,000 pupil objectives, stated behaviorally is presented. Also discussed is the development of a document file in Elementary Mathematics designed to serve local school districts in the selection of basic textbooks in elementary mathematics and to aid teachers and administrators in the development of mathematical activities.

Bernabei, Raymond. "Logical Analysis of Achievement Tests" (Unpublished Doctoral Dissertation, Western Reserve University, Ohio, June 1966.)

This study represents an exploratory approach in an attempt to suggest a measurement technique. The conceptualized inquiry used in this study was to determine what to evaluate, defining the behavior (through the use of Bloom's Taxonomy of Educational Objectives), analyzing each test exercise, recording the analysis and summarizing the evidence.

Bialek, Hilton M. "A Measure of Teacher's Perceptions of Bloom's Educational Objectives." Paper presented to the American Educational Research Association, February, 1967. (Mimeographed)

This paper investigated how teachers perceive objectives in terms of their importance or desirability. Bialek includes in his findings the fact that many teachers apparently do not feel that it is essential for certain categories of students to reach any objectives at all.

Bloom, A. M. "Inward Look," American Schools and Universities 37:11, December, 1964.

This is a short article on the need for educators to stop and analyze their own objectives in providing the best quality education for every American child.

Bloom, Benjamin S. et. al. Taxonomy of Educational Objectives (The Classification of Educational Goals), Handbook I: Cognitive Domain. New York: David McKay Company, Inc., 1956.

This book is an attempt to build a taxonomy of educational objectives. These are important since they do provide the basis for building curricula and tests, and represent the starting point for much of our educational research. As the Taxonomy is now organized, it contains six major classes: (1) Knowledge, (2) Comprehension, (3) Application, (4) Analysis, (5) Synthesis, (6) Evaluation. Each of these categories contain: A definition, illustrative objectives, a discussion of problems and considerations in testing objectives and examples of items testing objectives in the category.

The cognitive domain, which is the concern of this handbook, includes those objectives which deal with the recall or recognition of knowledge and the development of intellectual abilities and skills.

Bobbitt, Franklin. How To Make A Curriculum. Boston: Houghton Mifflin Company, 1924. pp.292. Also, Curriculum-making in Los Angeles, Supplementary Educational Monographs. No. 20. Chicago: University of Chicago Press, 1922, p. 106.

Over a period of twelve years, several hundred objectives were collected by Bobbitt and some 1500 members of graduate classes in "The Curriculum". The tentative list was submitted to "citizens, school officials, and teachers of Los Angeles." The critical examination made by some 1200 high school teachers formed the chief basis of revision. The final list represents a consensus of opinion.

Bonds, Alfred B., Jr. "Education for Wisdom". National Association of Secondary School Principals, Vol. 50, April, 1966, pp. 147-153.

An essay on the objectives that must be sought by modern educators. A renewed emphasis on the humanities in the high school is important according to the author.

Other objectives include: (1) More meaningful opportunities for the moral development of the students; (2) Develop systematic units which will reinforce our capacity to plan for the future and (3) Anticipation of consequences.

Brackenbury, Robert. "Guidelines to Help Schools Formulate and Validate Objectives". Rational Planning in Curriculum and Instruction, N.E.A. Washington, D.C., 1967.

In this article, the author gives eight tasks to be accomplished before any objectives can be made: (1) Achieving commitment; (2) Recognizing the nature of objective; (3) Exploring their sources; (4) Determining their appropriateness; (5) Worth; (6) Feasibility; (7) Organizing the staff for action; (8) Continuing nature of the job. He goes into a lengthy discussion of the tasks explaining how teachers and curriculum specialists can better function in the role on the educational continuum. Also, the author gives reasons why many educators have failed to formulate objectives.

Bruner, Jerome S., "Education as Social Invention". Saturday Review, February 19, 1966, pp. 70-72.

The author is making comment upon four changes that are evident in the nature of, direction of, and objectives that require consideration in thinking about education. The steps or stages of each have been variously described and he has followed through with four general policies from the issues he discussed. In this last discussion of policies, he put emphasis on various objectives related to each area.

Burns, Richard W. "Objectives and Classroom Instruction". Educational Technology, September 15, 1967, pp. 1-3.

This article calls up the need for behavioral objective specification. A list of ten suggestions for instructors is presented on what, how and why behavioral objectives should be established. The suggestions are representative of possible immediate steps which could be easily implemented within the structure of current educational practices.

Burns, Richard W. "The Practical Educational Technologist: Objectives in Action". Educational Technology, February 15, 1968, pp. 14-15.

Examples of objectives from the subject matter fields are presented to illustrate objectives covering the learning of knowledges, understandings, and skills. The objectives are presented with the idea that they are more real than the "manufactured", categorized lists of objectives often used. In each example, the subject, grade level, and objective is given. Those included are: English I, 10th grade; Biology I, 10th grade; Chemistry I, 11th and 12th grades; Physics, 11th and 12th grades; Lettering, 9th grade; American Literature, 11th grade; Vocabulary, 1st grade; Composition, 10th grade; and American History, 10th grade. The objectives are from lists furnished by teachers in and around El Paso, Texas.

Burns, Richard W. "The Theory of Expressing Objectives". Educational Technology, October 30, 1967, pp. 1-3.

Emphasis is placed on the need for educators to learn how to express objectives in behavioral terms. Several basic principles which guide the conceptualization and

development process are presented. The article goes on to illustrate the various parts of an objective: (1) Type or category of behavior; (2) Name of the behavior; (3) A behavioral description. An in-depth discussion of these three major parts of which an objective is composed is then undertaken.

Burr, James B., Lowry W. Harding and Leland B. Jacobs. Teaching in the Elementary School. New York: Appleton, Century, Crofts, Inc. 1950.

Chapter 8 of this book is very appropriate to that of objectives. It entails (a) the definition of evaluation; (b) how to come to some general agreement upon the objectives the school is to achieve; (c) a listing of the cardinal objectives of education; (d) the steps involved in evaluation; (e) the characteristics involved in a modern program of evaluation.

If instruments are not readily available for appraising certain objectives, one may adapt or revise substitutes and devise workable instruments.

Canfield, Albert A. "A Rationale for Performance Objectives", Audio-visual Instruction, No. 13 (Fall 1968) pp. 127-129.

The article begins with a presentation of the view of Mager, B. Lamar Johnson and Arthur M. Cohen on instructional objectives. Next, the utilization of rationales or motivational elements in performance objectives are illustrated. Examples are then given to show how one might enrich or enhance the meaningfulness and attractiveness of an instructional objective for both the instructor and the learner.

Carlisle Self-Study Project. An E.S.E.A. (Elementary and Secondary Education Act, P.L. 89-10) Title III grant to the Carlisle School District. United States Office of Education Grant (OEG No. 3729), January, 1967.

Concerned with curriculum revision, this proposal is based on the rationale that a school needs to evaluate the efforts of teachers and students by taking a concentrated look at the objectives of the various courses offered. It is hypothesized in this study that it is necessary to maintain a consistent language style in writing behavioral objectives. An extensive rationale, examples of behavioral objectives in various disciplines and selected test items are presented.

Carroll, Charles Robert. "Application of the 'Taxonomy of Educational Objectives' to Alcohol Education". Unpublished Doctoral Dissertation, Ohio State University, 1965.

Objectives of alcohol education were classified according to the Taxonomy. The appropriateness of the objectives for general education was then judged by ten alcohol education specialists and ten school health educators. The two groups of judges agreed 68% on the acceptance or rejection of each objective, but disagreed about their degree of importance. This may have been because of judges' individual values and different interpretations of the Taxonomy, general education, and the importance of alcohol education. It was concluded that the Taxonomy can be a useful logical schema for organizing alcohol education.

Chambers, W. M. "Testing and Its Relationship to Educational Objectives". Journal of General Education. Vol. 16, 1966, pp. 246-249.

The author discusses the need of having the objectives of a test coincide with the educational objectives of the course. Often tests evaluate recall while the teacher is stressing analysis. Course objectives are often designed to meet standardized tests. Both tests and objectives should follow Bloom's Taxonomy.

Chickering, Arthur W. "Instructional Objectives and Student Development in College", Journal of Applied Behavioral Science. Vol. 3, 1967, pp. 287-304.

Two general objectives, the development of independence and the development of purpose, were translated into six more specific variables of student development. Questions concerning concrete behaviors and attitudes reflected in the self-evaluations and instructor comments comprising the students' records were developed. The study states that general institutional objectives can be redefined and assessed to better inform the educator of decisions concerning institutional practices and innovation.

Cohen, Arthur M. "Defining Instructional Objectives," in System Approaches to Curriculum and Instruction in Open-Door College. Occasional Report from U.C.L.A. Junior College Leadership Program, No. 9, January, 1967, pp. 27-28.

Cohen suggests the use of both goals and objectives in course statements by first identifying the educational purposes in relation to the total education institution. He develops goals as broad generalized statements and proposes the preparation of terminal and interim performance statements in conventional Magerian form.

Cox, John A. "Instructional Objectives and Measuring Success of Instruction." Symposium, The George Washington University, Human Resource Research Office, Alexandria, Virginia, 1966.

Given instructional objectives, test items to measure these objectives are relatively easy to conceive. Content validity for the test can be attained by sampling procedures; construct validity is prima facie; predictive validity can be computed, if it is reasonable to do so. The logic of developing a curriculum independently from the test is discussed, and use of the test for controlling the quality of trainees is emphasized.

Cox, Richard C. "Item Selection Techniques and Evaluation of Instructional Objectives." Paper read at the Annual Meeting of the National Council on Measurement in Education, Chicago, February, 1965.

This study hypothesizes that the validity of an educational achievement test depends upon the correspondence between specified educational objectives and the extent to which these objectives are measured by the evaluation instrument. An examination of the effect of some commonly used test construction procedures which has some consequences for the desired correspondence inferred in the above hypothesis are presented in this study.

Crawford, Meredith P. "Concepts of Training" in Psychological Principles in System Development (Robert M. Gagnē, Ed.) New York: Holt, Rinehart and Winston, 1962, pp. 301-342.

An overview of seven major steps in a training development project. These are described as: analysis of the system, analysis of the particular job, specification of knowledges and skills, determination of training objectives, construction of the training program, development of measures of performance proficiency and evaluation of the training program.

Crawford, Meredith P. "Research and Development in Training and Education". Paper read at Symposium on the Contributions of Research to Education and Training, Northwestern University, Evanston, December, 1959, pp. 22.

Discussion of the relationship between military training research and education. The course of training program development was described in terms of job analysis, specification of knowledge and skills, development of training program, construction of achievement and proficiency tests, and evaluation of the training program. Training was differentiated from education in terms of precision with which content can be identified and degree of predictability of use made of the content. This paper indicated the importance of demonstrations for implementation.

Crawford, Meredith P. "Techniques in Course Development." Paper read at Administrator's Training Seminar, Bureau of Personnel, U.S. Navy, Washington, May, 1966.

Techniques that have evolved for developing an effective training program are described as follows: (a) Analyze the system in which the role is located; (b) Analyze the particular role and its place in the system; (c) Develop proficiency measures; (d) Specify the knowledge and skills needed by the individual in the role; (e) Determine behavioral objectives; (f) Construct the training program; and (g) Test the program.

Danielian, Jack. "New Perspectives in Training and Assessment of Overseas Personnel." Paper read at Counterinsurgency Research and Development Symposium, Institute for Defense Analysis, Arlington, Virginia, June, 1966.

Lack of knowledge of what constitutes successful performance in paramilitary roles abroad is a major barrier to developing valid selection procedures or appropriate training techniques. One approach to the problem is to focus on an attempt to cultivate individual qualities of personnel as elicited in a live simulated advisory situation. Using trained foreign participants in prepared role-playing scripts, a simulated cross-cultural encounter was constructed which provided a realistic face-to-face encounter with a counterpart. In addition, the simulation permitted the conceptualization of a number of interrelated intervening objectives susceptible to measurement and useful to assessing the performance of the trainee. It is concluded that the specific discovery potential and heuristic value of the technique are distinct assets in this new area of research.

Davis, O. L. Jr. and Drew C. Tinsley. "Cognitive Objectives Revealed By Classroom Questions Asked by Social Studies Student Teachers," Peabody Journal of Education, Vol. 45, July, 1967, pp. 21-26.

This article contains a study designed to determine the range of cognitive objectives manifest in secondary school social studies classrooms by questions asked by student teachers and their pupils. For this study, a "teacher-pupil question inventory" (TPQI)

was developed and used. It consisted of nine categories, seven of which are based on the Bloom Taxonomy and the formulations of Sanders. This study indicated that memory or the acquisition of knowledge was the major cognitive objective apparent in teachers' and pupils' verbal questions in these social studies classes. Tables of statistics are also included.

DeCecco, John P. "Educational Objectives and Curriculum Development," Human Learning in the School. San Francisco State College, Chapter 10. New York: Holt, Rinehart and Winston, 1967, pp. 566-575.

An excerpt from Bloom's Taxonomy points up the need for education objectives and considers the range of intellectual objectives possible. Three sources commonly used in thinking about objectives are stated: (1) Information available about the students; (2) The conditions and problems of contemporary life which make demands on young people and adults and which provide opportunities for them; (3) The nature of the subject matter and the deliberations of subject matter specialists on the contributions their subject is able to make to the education of the individual.

The cognitive objectives may be divided into two parts:
(I) Behavior of remembering or recalling knowledge and,
(2) The more complex behaviors of the abilities and skills.

Doherty, Victor W. "Procedure for Growth", Educational Leadership, Vol. 23, December, 1965, pp. 247-249.

This article is an account describing an effort to engage a large number of classroom teachers in defining instructional objectives and constructing courses and workshops based on these objectives. A principle ingredient in this program is the employment of carefully selected classroom teachers to plan and teach in-service courses of continuing growth.

Dressel, P. L. (ed.) Evaluation in General Education. Dubuque, Iowa: William C. Brown Co., 1954.

The nature, role, and extent of the evaluation phase of a general education program depends heavily on the objectives and philosophy dominant in that program. In this book, 13 colleges and universities concerned with the general education have given their earnest and significant attempts to carry on evaluation practices as an integral part of the planning and operation of their program. Primary emphasis is upon preparation for the respective professions. In most instances, aims for general education are mentioned.

Dressel, P. L. and C. H. Nelson. Questions and Problems in Science, Test Item Folio No. 1. Princeton: Educational Testing Service, 1956.

This folio contains over thirteen thousand items organized under the major categories of educational objectives in the biological and physical sciences. An attempt has been made to classify each item in categories of Bloom's Taxonomy of Educational Objectives.

Dressel, Paul L. "Measurement and Evaluation" in the Yearbook of American Association of Colleges for Teacher Education. Washington: American Association of Colleges for Teacher Education, 1960, pp. 45-52.

Studies of instructional objectives classified along various continua, such as simple-complex, achievable-unachievable, explicit-implicit, intrinsic-transcendental, individual-social, and so forth. Educational objectives tend toward formulations that bear resemblance to psychological traits. Studies of instructional objectives and methods should take matters of cost and work load into consideration.

Duluth (Minn.) Public Schools. Individualizing the Instructional Program. 1966. pp. 37 (Prepared by Thorwald Esbensen).

Methods and concepts relevant to individualizing instruction are discussed. Objectives and methods of assessment are presented. The appendix includes sample individualized assignments.

Duluth (Minn.) Public Schools. Performance Objectives. 1967, pp. 23 (Prepared by Thorwald Esbensen)

Emphasizes the importance of expressing instructional objectives in terms of observable student performance. Discusses the effect of new instructional objectives on curriculum; states that as objectives change there will be increased emphasis on individualized instruction and self-directed learning.

Dyer, Henry S. "Discovery and Development of Educational Goals." National Association of Secondary School Principals, Washington: National Association of Secondary School Principals, NEA. No. 51, March, 1967, pp. 1-14.

In spite of all the work put into developing educational goals and how to define them, the goals produced have been essentially non-functional. The dilemma of quantity versus quality is handled. The reason for the goals established thus far being non-functional, is three-fold: (a) Too much reliance on the magic of words; (b) Too little public participation in formulating the goals; and (c) Too great a readiness to suppose that the goals are already given and require only to be achieved. Dyer concludes that measurement in education is the only process by which a society can externalize and give effect to its hopes for the next generation.

Ebel, Robert L. "Obtaining and Reporting Evidence on Content Validity." Educational Psychological Measurement, Vol. 16, No. 3, Autumn, 1956, pp. 269-282.

A proposal that behaviors selected as objectives be translated, as directly and completely as possible, into an extended series of test problems.

Edling, Jack V. "A Study of the Effectiveness of Audio Visual Teaching Materials When Prepared According to the Principles of Motivational Research." U.S. Office of Education, NDEA Title VII, Project No. 221. Monmouth: Teaching Research Division, Oregon State System of Higher Education, June 19, 1963, pp. 214.

One component of this study concentrates on measurement problems in the Affective Domain. Among the results of experimentation on this problem is the finding that pretesting in the Affective Domain had the opposite effect of pretesting in the Cognitive Domain. Post-test scores in the Affective Domain were depressed, whereas

pretesting typically enhanced post-test scores in the Cognitive Domain. The measurement methodologies appear to differ among the domains--Cognitive, Affective and Psychomotor which may have a bearing on the pretest, post-test difference noted above. In addition, it is hypothesized that knowledge of the learner's existing attitude and values is crucial in the design of strategies to attain objectives in the Affective Domain.

Edling, Jack V. "Educational Objectives and Educational Media." Review of Educational Research. Vol. XXXVIII, No. 2, April, 1968, pp. 177-193.

This paper explores the relationship between educational objectives and media, i.e., the nature and extent of the contribution which media and technology have made to the achievement of given objectives. An extensive review of the literature is provided in both the areas of educational media and writing behavioral objectives. The review of literature is broken down into the following categories:

(a)Media and Learning Responses; (b) Instructional Strategies; (c) Learning Modalities; (d) Learning Domains; and (e) Media and Measurement.

Educational Policies Commission. "The Central Purpose of Education." NEA Journal, September, 1961, pp. 13-16.

The Educational Policies Commission believes the school must be concerned with the seven cardinal objectives. Yet, they recognize the difficulty of achieving all these goals fully. In light of this, they suggest that the central purpose of education is "command of the fundamental processes." The article centers the other six objectives around this one and discusses each in relationship to the individual's ability to think critically.

Educational Policies Commission.The Purposes of Education in American Democracy. Washington, D.C.: American Council on Education, 1938.

The book describes what the schools in the United States ought to try to accomplish, and also what "actions" or objectives must be done or stated in order to reach this goal. As the book points out, educators must pool their needs on education and the goals they are trying to accomplish. As a result, the actions and objectives will follow. There are four chapters on objectives: self-realization, human relationships, economic efficiency, and civic responsibility.

Eisner, E. W. "A Response to My Critics", The School Review. Vol. 75, Autumn, 1967, pp. 277-282.

A short article in which the author defends his "Education Objectives: Help or Hindrance". The two criticisms that are defended in this article are: That he has "misinterpreted curriculum theorists" and that he has misconceived the function of educational objectives. First, there appears according to Eisner, no evidence to indicate that by stating objectives that the behavior of instructors will improve. Secondly, objectives in many cases are too numerous and particularized to be used in the classroom. At the end of the article, he raises some interesting questions of his critics, one of which is: If teachers are to have educational objectives, how many, and under what conditions are they to be formulated?

Eisner, Elliott W. "Educational Objectives: Help or Hindrance." The School Review, Autumn, 1967, pp. 250-260.

This paper argues that curriculum theory as it pertains to educational objectives has four significant limitations. They are: (a) Lack of sufficient emphasis on the extent to which the prediction of educational outcomes cannot be made with accuracy; (b) Lack of a clear description on the ways in which the subject matter affects precision in stating educational objectives; (c) Confusion regarding the use of educational objectives as a standard for measurement when in some areas it can be used only as a criterion for judgment; and (d) Lack of distinction between the logical requirement of relating means to ends in the curriculum as a product and the psychological conditions useful for constructing curriculums. Eisner's points are analyzed by three experts in this area of curriculum technology (Robert L. Ebel, J. Thomas Hastings and Arline Payne) and their reactions are presented in separate papers in this same periodical. In the final analysis, all of the above writers seem to suggest that the contribution of educational objectives to the processes of curriculum construction, teaching, and learning is, at best, an empirical problem. The claims that have been made concerning their utility and importance have not as yet been substantiated by empirical evidence. The research literature which suggests that educational objectives when clearly specified facilitate the construction of curriculum, learning, or teaching, is inconclusive.

Elliott, C. B. "Cognitive Dimensions of Lesson Objectives Set By Secondary Student Teachers." Unpublished Master's Thesis, Kent State University, 1965.

This study investigates the feasibility of developing a procedure enabling educators to utilize the Taxonomy in evaluating lesson plan objectives. The study explores (a) using the Taxonomy to analyze the lesson objectives of student teachers; (b) using judges to independently categorize these objectives according to a prescribed graphic scaling format based on the Taxonomy; and (c) determining which of two such formats was most practicable. Correlational analysis of data failed to support the hypothesized interrater agreement and reliability. The data also failed to support the hypothesis that the level of raters' prior knowledge of the use of the Taxonomy makes a difference.

Ellis, John Kenneth. "The Application of the 'Taxonomy of Educational Objectives' to the Determination of Objectives for Health Teaching." Unpublished Doctoral Dissertation, University of Michigan, 1963.

The Taxonomy was utilized to identify different levels of thinking in relation to specific health content and to help select objectives and content for health teaching. The Taxonomy was the framework used to generate 354 objectives. Major conclusion regarding the Taxonomy purports that the categories are applicable to the field of health education in helping to define substantive content and objectives.

Esbensen, Thorwald. "Writing Instructional Objectives," Phi Delta Kappan, Vol. 48, January, 1967, pp. 246-247.

This article deals with the composition of a well-written instructional objective. It should say three things: (I) What it is that a student who has mastered the objective

will be able to do; (2) Under what conditions he will be able to do it; and (3) To what extent he will be able to do it. Explicit examples of objectives are presented in the hope that one major cause of learning failure among students: the traditional fuzziness of classroom assignments, can be eliminated.

Fenton, Edwin. The New Social Studies. New York: Holt, Rinehart and Winston, Inc., 1967, Chapter 2.

The author presents various problems which complicate the teaching of social studies and the setting of appropriate specific objectives for instruction. A sampling of these problems include: (1) Terms such as "citizenship education" have different meanings for different people; (2) Attitudes and values change--what will tomorrow's world be like? (3) Knowledge becomes obsolete so quickly. Bloom's Taxonomy is mentioned and the classifying of cognitive skills is discussed as they apply to social studies instruction. The affective domain and its significance to social studies is also discussed. Mr. Fenton concludes the chapter by discussing how the three clusters of objectives (1) attitudes and values, (2) inquiry skills, and (3) knowledge of selected content can be shaped to resolve each of the problems presented at the beginning of his chapter.

Findley, Warren G., Norman O. Frederiksen, and David R. Saunders. "An Analysis of the Objectives of an Executive-Level Educational Program", Technical Research Report No. 22, Air Research and Development Command, Human Resources Research Institute, Maxwell Air Force Base, Alabama: January, 1954, p. 34.

A detailed and systematic analysis of the outcomes expected in the Field Officer Course of the Air University, expressed in terms of the anticipated job behavior of the graduate. A total of 502 statements of objectives were classified into 12 types. The types were further classified into two groups of six types each. The groups represented individual behavior and social interaction.

Flanagan, John C. "Contributions of Research in the Army Air Forces to Educational Policy," Educational Records, Vol. 28, Supplement No. 16, January, 1947, pp. 78-90.

A discussion about how the Army Air Forces used scientific methods of research to define objectives and to evaluate an individual's effectiveness as a result of testing and training toward a set goal. Since this method proved to be very successful, it is recommended that the same techniques can be applied in the field of education to develop sound educational policies.

Flanagan, John C. "Functional Education for the Seventies." Phi Delta Kappan, September, 1967, pp. 27-32.

The emphasis in this article is on the intent of PROJECT PLAN--a systematic approach to providing an individualized learning program for children in 12 school districts in both the eastern and western sections of the country. Key elements that are discussed in this paper regarding PLAN are: (a) An array of teaching-learning units, which can be identified and assigned to a given pupil on the basis of an analysis of him, and can be treated by students and teacher as a unit; (b) A large set of educational objectives, defined in terms of a variety of kinds of observable and measurable behavior, which will provide "a comprehensive set of educational

objectives which define the new system of education"; (c) A set of procedures for measuring or assessing the performance of the student in terms of the specific knowledge, ability, skill, or attitude defined in the objective; (d) A set of methods and materials for guidance and individual planning; and (e) a computer to store and retrieve information on each pupil in the system.

Flanagan, John C. "Research Techniques for Developing Educational Objectives," Educational Records, Vol. 28. April, 1947, pp. 139-148.

It is proposed that the first step in developing educational objectives is a systematic definition of the problem, including a tabulation of the types of adult activities in which educational organizations are attempting to insure successful participation. The next step is to set up a list of critical requirements for these activities. Meaningful objectives for American education should be based on scientific study, as well as human judgment.

French, Will. et. al. Behavioral Goals of General Education in High School. New York: Russell Sage Foundation, 1957.

For the preparation of this book, a study was made in which 75 leading educators participated as consultants, advisors, and reviewers. The proposed lists of behavioral outcomes are organized under three maturity goals (or general objectives) and four areas of behavioral competence, which are intended to help teachers develop their most effective general education program. In chapter one, there is a very good section on how the overall behavioral objectives of general education are being achieved. A list of eleven established goals or objectives are presented to show how broad and general most of these objectives are. The book contains many charts and tables on the objectives of self-realization, human relationship, economic efficiency, civic responsibilites and related behavioral outcomes in our organizations of education.

Furst, Edward J. Constructing Evaluation Instruments. New York: Longmans, Green and Co., Inc. 1958.

The author analyzes several basic problems met in developing any evaluation technique--determining what to evaluate, defining the what in terms of behavior, selecting appropriate situations, and summarizing the evidence. Determining what to evaluate includes an excellent section pertaining to educational objectives.

Gagné, Robert M. "The Acquisition of Knowledge", Psychological Review Vol. 69, No. 4, July, 1962, pp. 355-365.

Analysis of students' ability to master a final task. The following question was asked: "What would the individual have to do in order to attain successful performance on this task, provided he is given only instructions to perform the task, and does not have to learn anything new?" This question was asked in relation to subordinate tasks, and so on to more difficult ones. Students who had not mastered the subordinate were shown to be unable to achieve the higher order tasks. On the other hand, students who had mastered the final task had done so, not by practicing it alone, but by having mastered the subordinate tasks.

Gagné, Robert M. The Conditions of Learning. New York: Holt, Rinehart and Winston, Inc., 1965, pp. 172-266.

Gagné places the emphasis of determining educational objectives upon a sequencial plan of instruction in content areas of various capabilities. This instructional process takes up the initial task of establishing motivation, of presenting a suitable stimulus situation, of delivering verbal communications, and of providing for learning feedback. Beginning objectives or subordinate objectives in a topic imply the learning of verbal chains, multiple discriminations and concepts, and become more complex with the terminal objective, as supplied by a precise task analysis, as the ultimate goal.

Gagné, Robert M. "Military Training and Principles of Learning." American Psychologist, Vol. 17, No. 2, February, 1962, pp. 83-91.

The basic principles of training design consist of: (a) identifying the component tasks of a final performance; (b) insuring that each of these component tasks is fully achieved; and (c) arranging the total learning situation in a sequence which will insure optimal mediational effects from one component to another. The traditional principles of learning, such as reinforcement, differentiation of task elements, familiarity, and distribution of practice are much less important in training than are the principles of task analysis, intra-task transfer, component task achievement, and sequencing.

Garvey, James. "The What and Why of Behavioral Objectives", Instructor LXXVII:8, April, 1968, pp. 127.

This article pointed out some behavioral objectives which will guide the teacher in selecting learning procedures which will foster desirable behavioral changes in the learner. Four objectives suggested are: (1) Assign a specific task for the pupil to do after he has had the learning experience; (2) Describe an intended outcome rather than make a summary; (3) Define and prescribe the terminal behavior sought in the student; (4) Identify the kind of performance which will be accepted as evidence that the learner has achieved the objective. Perhaps Mager said it best: "If you give each child a copy of your objectives, you may not have to do much else."

Gerberich, J. R. Specimen Objective Test Items: A Guide to Achievement Test Construction. New York: Longmans Green, 1956.

A valuable reference consisting of eleven chapters of specimen items for measuring various educational outcomes, including appreciations, attitudes, and interests.

Gerhard, Muriel. "Behavioral Outcomes: What the Child is able to do--and does--as a Result of the Teaching-Learning Experience." Grade Teacher, April, 1967.

The author is aware of the pressing problems in education, including the need for a revision of educational objectives. Discussed in the article is the "Behavioral Outcomes Program" as used in the Norwalk, Connecticut schools. The school system recognized six different objectives: Knowledge, Tool-skills, Self-directive behaviors, Socially-effective behaviors, Positive attitudes toward and interest in context areas, thinking processes. The objectives are expanded upon in the article to give practical meaning to each.

Gerlach, Vernon S. and Howard J. Sullivan. "Constructing Statements of Outcomes." Southwest Regional Laboratory for Educational Research and Development, Inglewood, California, 1967. (Mimeographed Report).

This report is designed to aid the reader in the process of writing objectives that are stated in behavioral terms. Four criteria are suggested as basic considerations for this task. They are: (a) Does the objective describe a learner performance or product? (b) Is the performance or product observable or identifiable? (c) Are the conditions under which the performance or product is to occur stated? (d) Is a criterion or standard stated? Five words and their definitions are presented to aid the writer in describing and classifying cognitive objectives. These words are (a) Identify; (b) Name; (c) Describe; (d) Construct; and (e) Order. It is reported that teachers and researchers who have used these words and their definitions have found it is possible with these five words to classify nearly all the school objectives which relate to the cognitive domain.

Gerlach, Vernon S. "Describing Educational Outcomes." Southwest Regional Laboratory for Educational Research and Development, Inglewood, California, 1967. (Mimeographed Report).

This report is designed to enable the reader to distinguish objectives which are stated in behavioral terms from those which are not, given examples of each type, and to construct stated objectives. The concepts developed in this report are based on the assumption that objectives of instruction must be defined in terms of identifiable and observable operations or products. The criterion for writing behavioral objectives are presented for the reader with step-by-step exercises designed for self-instruction in the procedures required for writing objectives in behavioral terms.

Glaser, Robert. "Adapting the Elementary School Curriculum to Individual Performance." Learning Research and Development Center, University of Pittsburgh, Pittsburgh, Pennsylvania, October, 1967, (Mimeographed Report.)

This paper concentrates on describing requirements that are necessary for adapting the curriculum of the school to the individual differences of learners. The technicalities for designing, and implementing a system with these requirements and the necessary teacher, administrative, and material needs are discussed. Major aspects and questions raised in individualizing the school curriculum are also given consideration. The first aspect discussed in this paper concentrates on the analysis and definition of a continuum of educational objectives. It is pointed out that one of the most important factors that can contribute to improvement in educational attainment in an individualized system is the analysis and specification of the desired outcomes of learning. Some of the points supporting this first aspect are: (a) The definition of instructional objectives, instructs the curriculum and the teacher how to proceed; (b) The interaction between the specification of objectives and experience in teaching frequently provides a basis for a redefinition of objectives; (c) Regardless of the way a subject matter is structured, there is usually present some hierarchy of sub-objectives which indicates that certain performances must be present as a basis for learning subsequent performances; (d) Knowlege of objectives by the student gives him a goal to attain; such knowledge is instructive and motivating; (e) As in other lines of

endeavor, teachers require frequent information about the results of their work so that they can adjust their practices accordingly; and (f) The exercise of specifying objectives points up the inadequacies and omissions in a curriculum.

Glaser, Robert. "The Design of Instruction" in Sixty-fifth Yearbook of the National Society for the Study of Education, Part II. Chicago: The University of Chicago Press, 1966.

This paper suggests some theory and research which may influence the activities of the "instructional designer". The following design components are elaborated on as they relate to the "instructional designer" mentioned above: (a) analyzing the characteristics of subject-matter competence; (b) diagnosing pre-instructional behavior; (c) carrying out the instructional process, and (d) measuring learner outcomes.

Glaser, Robert. "The Education of Individuals." Learning Research and Development Center, University of Pittsburgh, Pennsylvania: September, 1966. (Mimeographed Report).

This working paper briefly describes the background, history, pedagogical requirements, psychological facts, technical instructional requirements, and organizational and administrative structures necessary to build a successful system for the education of individuals. Goals, obstacles, and patterns (administrative) of individualized learning are discussed. In addition, requirements for an effective individualized instructional program are presented. One of these requirements emphasizes the importance of well-defined sequences of progressive, behaviorally defined objectives in various subject areas as a pre-requisite to establishing guidelines for a student's program of study.

_____ "Goals of Primary Education." School and Society, Vol. 96, Summer, 1968, pp. 295-296.

Six goals of primary education are defined by UNESCO. Two phases are handled; from 6 to 10, and 10 and over. For each of the two phases, a detailed list of objectives is given which corresponds to either the younger or older phase group.

Goodlad, John I. "Regional Study Centers Suggested Toward Improved Curriculum Organization," The Education Digest, Vol. 29, February, 1964, pp. 19-22.

Educational objectives should provide the first clues for determining the learnings to be arranged in the curriculum. The public, through the local board, is reponsible for determining the broad aims of education. The professional staff is responsible for translating the broad aims into specific objectives. It is recommended by the author that regional centers should be set up to work in partnership with local schools to assist them in providing the best educational opportunities.

Gordon, George G. and Ernest J. McCormic. "A Study of the Activity Connotations of Descriptive Verbs," Occupational Research Center, Purdue University. Indiana: September, 1962, pp. 26.

"...an attempt was made to classify verbs used to describe a set of tasks along a continuum of orientation, where the end points were defined as: (1) Task-Oriented--those words which characterize what is accomplished in a learning

activity in terms of objectives, but do not specifically characterize what the student is doing; (2) Student-Oriented--those words which characterize what the student is doing, that is, the human behaviors that are involved in the task." A total of 300 words having some degree of student orientation were judged along a 7-point scale. Pooled judgments had substantial reliability.

Gwynn, J. Minor. "The Aims-and-Objectives State and Activity Analysis," in Curriculum Principles and Social Trends, 3rd Ed., New York: The Macmillan Co., 1960, pp. 144-149.

W. W. Charters, in 1923, believed that the aim of all activity was to secure satisfaction, and that an objective statement of types of activity comprises what we call ideals. He goes on to list seven sequential steps (rules) to follow for curriculum construction. In essence they are: (1) Determine major objectives by a study of man in his social setting; (2) analyze these objectives into ideals and activities; (3) arrange them in order of importance; (4) raise in order of importance, those objectives and activities which are high in value for children but low in value for adults; (5) determine which can be handled in the school education after deducting those that can be better learned outside of school; (6) collect the best practices in handling these objectives and activities; (7) arrange the materials in proper instructional order according to the psychological nature of the children. Franklin Bobbitt, 1924, divides human experience into ten major fields. He further sets up eight techniques for learning.

Haberman, Martin. "Behavioral Objectives: Bandwagon or Breakthrough," The Journal of Teacher Education, Vol. XIX, No. 1, Spring, 1968.

The values and limitations of using the behavioral objectives approach are discussed. First presented are its benefits with examples to substantiate the claims. Next, the limitations are presented, and also contain examples to show any form of hindrance behavioral objectives might have on education. The common issues are all discussed which relate to the behavioral objectives approach to curriculum development.

Haehn, Arthur J. "The Design of Cross-Cultural Training for Military Advisory." Paper read at Symposium, Meeting of American Psychological Association, New York, 1966.

This paper deals with the design of training for military advisors, with particular attention to the objectives toward which the training should be directed and the kinds of content coverage needed. Factors that make the advisor's assignment quite different from typical military assignments include the usual physical and cultural setting, the unfamiliar functions to be performed, and the complex intercultural, international, and interpersonal aspects of the role. Adequate preparation requires high-order knowledges and skills that can be developed only by adoption of new perspectives for training. These new perspectives relate not only to objectives and content, but also to the overall plan for programming area training into the larger pattern of education and training spanning the military officer's career.

Haehn, Arthur J. "How to Analyze Performance Objectives to Determine Training Content." Research Memorandum, Human Resources Research Office, The George Washington University, 1966.

This is the second of a series of guidance documents concerning the design and development of integrated school training programs for first-enlistment personnel in

electronic maintenance. The purpose of the series was to assist instructors in: (a) reducing the time required for formal school training, and/or improving the initial job capabilities of electronics repairmen; and (b) improving individual technical training provided at the unit level for electronics repairmen in units with a full-time training mission. This report is concerned with how to analyze performance requirements in order to define training content. Divided into two parts, it consists of a statement of assumptions, concepts, and principles relating to the analysis of performance requirements, and describes procedures for applying the concepts.

Hammond, Robert L. "A Design for Local Evaluation." The Epic Forum, Project Epic, 1934 East Adams Street, Tucson, Arizona, 1967, pp. 3-6.

This paper presents a structure and model for developing evaluation programs at the local level. The position taken in this paper is that research has failed to produce adequate guidelines and procedures to be utilized by school districts for the purpose of evaluating both current and innovative programs. As basic considerations for evaluation, several dimensions are presented and discussed. They are: (a) The Instructional Dimension (The dimension of the above-mentioned model which describes the innovation in terms of specific variables); (b) The Instructional Model (The dimension of the model that is defined by the variables of child, teacher, administrator, educator, specialist, family and community); and (c) The Behavioral Dimension (The dimension of the model that is defined by the variables of Cognitive, Affective and Psychomotor Behavior.) As part of the model for evaluation, stating objectives in behavioral terms represents one of the most crucial steps. The paper suggests that properly stated objectives will: (a) specify the kinds of behavior which will be accepted as evidence that the learner has achieved the objective; (b) state the conditions under which the behavior will be expected to occur; and (c) specify the criteria of acceptable performance by describing how well the learner must perform.

Hausdorff, Henry. "Empirical Determination of the Relative Importance of Educational Objectives," The Journal of Experimental Education, Vol. 34, No. 1, Fall 1965, pp. 97-99.

The specific purpose of this study was to determine whether through the use of techniques of scaling, the relative importance of educational objectives can be determined. A listing of eight basic objectives is presented (for secondary students). Data is then given to support the conclusions and implications of the study.

Herron, Dudley, J. "Evaluation and the New Curricula," Journal of Research in Science Teaching, Vol. 4, 1966, pp. 159-170.

This study was an effort to compare CHEM Study with a conventional chemistry course in terms of the cognitive ability exhibited by students. Cognitive ability refers to any of those abilities described by the Taxonomy of Educational Objectives. The author is encouraged by the prospects of using tests based on the Taxonomy as part of curriculum evaluation.

Higgins, Martin J. and Jack C. Merwin. "Assessing the Progress of Education", Phi Delta Kappan, Vol. 48, No. 8, April, 1967, pp. 378-380.

The article reported the objectives that were identified through the involvement of specialists and teachers in the various subjects taught in the schools. These objectives were selected from a larger list of objectives which specialists, teachers, and lay-people felt were the important objectives, aims, or goals to be reached. The article also put these selected objectives under the appropriate subject. Thus, it gives the reader a quick list of objectives that are advocated for the subject.

Hill, Winfred F. Learning, A Survey of Psychological Interpretations. San Francisco: Chandler Publishing Co., 1963, pp. 2-6.

Part of what a child learns in school is measurable as specific knowledge and skills, while another part involves changes, some very subtle but a few quite dramatic, in attitudes, emotions, social behavior, and a variety of other reactions. Education objectives must then be based on an analysis of such complex situations, with an understanding of the learning principle and motivation involved.

Hoover, W. F. "Specification of Objectives," Audiovisual Instruction, Vol. 12, January 1967, pp. 597.

This short article deals with Dr. Wedberg's discovery of an audience-participation game which has proved to be a significant addition to the technology of writing behaviorally stated objectives. This game is based on his analysis of all action verbs used to describe behaviors into ten categories. In this way, objectives should be easier to communicate to others as a result of this standardization on ten verbs. Details of the schema of verbs and the game presentation program are supplied in the new $1.75 publication, Constructing Behavioral Objectives.

Horn, Francis. "The Ends for Which We Teach," The Educational Forum, Vol. 28, No. 2, January, 1964, pp. 133-143.

This article is a critical look at our objectives in education today. The stress upon the three R's is not sufficient for today's goals. More effort should be spent in teaching students how to convey spoken ideas and how to listen more effectively. Less emphasis should be made on foreign languages, and more upon learning and understanding the countries of the world. Literature should not be based on the assumption that what was good for us should be good for our children, but rather, it should be more representative of our times. The emphasis of education should be placed on teaching students to want to bring about a change to make the world his community.

Hough, John B. "Interaction Analysis in a General Methods Course." Classroom Interaction Newsletter, Temple University, Vol. 1, No. 2, May, 1966, pp. 7-10.

A general methods course for secondary school teachers serves as the context for this paper. Teaching as described by Hough, is defined as "a four-phase act" which involves the following: (a) Selecting and organizing the content of instruction and stating instructional objectives as observable student behaviors; (b) Selecting appropriate instructional strategies and instruction; (c) Measuring change in student behavior as defined by instructional objectives; and (d) Evaluating the effectiveness of instruction and the appropriateness of objectives. The students (teachers) who participate in this general methods course are taught that on the basis of date, they as teachers must make the judgment as to whether or not their teaching has been effective. If a reasonable number of students fail to meet the objective (as stated prior to instruction) then the lesson or series of lessons that were designed to help students meet the objective must be judged as having been ineffective, and the teacher must assume the responsibility for his failure. To assure responsibility means to strive to find out where and how he failed. If the teacher succeeds, (i.e., most of his students meet the objective), then he should know why, so that he may in the future profit from his successes as well as his failures. A detailed rationale, and complete description of the above methodology of instruction are discussed in this paper.

Hunkins, Francis P. "The Influence of Analysis and Evaluation Questions on Critical Thinking and Achievement in Sixth Grade Social Studies." Unpublished Doctoral Dissertation, Kent State University, 1966.

This study attempts (a) to determine if the dominant use of analysis and evaluation (Taxonomy categories) questions in social studies text-type materials would stimulate the development of pupils' critical thinking in sixth grade social studies; and (b) to discover if this emphasis would improve achievement in social studies. Major conclusions of the study relevant to the Taxonomy are as follows: (1) There were no significant differences in the critical thinking abilities among pupils using materials with question emphasis on analysis and evaluation and pupils using materials with question emphasis on knowledge; (2) Pupils receiving analysis and evaluation type questions had significantly higher scores in social studies achievement than did pupils receiving knowledge type questions.

Inlow, Gail M. The Emergent in Curriculum, New York: John Wiley & Sons, Inc., 1966.

In Chapter One, Professor Downey, in 1960, put together what is probably the best synthesis of educational objectives prepared to that time. It takes into account, these four areas: (a) Intellectual Dimensions, (b) Social Dimensions, (c) Personal Dimensions, (d) Productive Dimensions. The three major objectives: Transmissive, adaptive, and developmental are described in detail.

Intensification of the Learning Process. An E.S.E.A. (Elementary and Secondary Education Act, P.L. 89-10) Title III grant to the Bucks County Schools, Raymond Bernabei, Director. United States Office of Education Grant (OEG No. 2965), August, 1966.

This proposal is designed to focus on the primary grade student. The major phases of this program are: (a) Child and Youth Study Services; (b) Instructional Media Center and Services; and (c) Personalized Educational Prescriptions. Progress reports indicate that an elementary pilot school's curriculum has been redeveloped into a multi-level learning program by curriculum specialists. The process was to establish the general objectives in the subject matter areas and to write specific objectives for each learning unit; behavioral objectives were then written to identify the expected tasks to be performed by the student.

Jarolimek, John. "The Taxonomy: Guide to Differentiating Instruction" Social Education. Vol. 26, 1962, pp. 445-447.

The Taxonomy is suggested as a model in planning for differentiating instruction in elementary social studies. The teacher can prepare the various categories in chart form to assist in (a) the planning of a unit; (b) the specification of objectives; (c) the diagnosis of student weaknesses; (d) the planning of appropriate learning activities; and (e) the presentation of a highly diversified attack on the study of problems.

Jeffries, Derwin J. Lesson Planning, Lesson Teaching. Titusville, New Jersey: Home and School Press, 1966, pp. 513-524.

The author recognizes the fact that our present educational objectives are over-simplified and as a result, are subject to a variety of interpretations. He states several broad educational objectives and cites illustrative examples of their oversimplification. A checklist is provided for those teachers who would like to emphasize definite values, effective personality, and ethical character.

Jones, Edna M. and Jean B. Fairman. "Identification and Analysis of Human Performance Requirements," in Human Factors Methods for System Design, (John D. Folley, Jr. ed.) The American Institute for Research, Pittsburgh, 1960, pp. 43-62.

Identification of skill and knowledge requirements and description of rating systems for degree of skill and knowledge required. Behavioral categories suggested are: Discriminations and perceptions; manual skills and operations; decision-making, mental skills and capabilities; recall of specific or general principles.

Joyce, Bruce R. "Flexibility In Teacher Behavior." Classroom Interaction Newsletter, Temple University, Vol. 2, No. 2, May, 1967, pp. 5-12.

This report attempts to bring together a number of studies of flexibility in teacher behavior and examine the implications of the studies for a theory which helps explain the formation of teaching styles. One of the studies discussed in this paper deals with the decision-making processes employed by pre-service teachers who were planning and teaching lessons in public schools. The subjects for this experiment were interviewed in an effort to find out how they determined the objectives, methods, and

materials employed in the lessons they planned to teach. It was found that nearly all the decision-making processes had little to do with rationalized educational theory. Lessons rarely had objectives, methods were intuitively arrived at and not reflected on as choices from alternatives. The materials did not appear to be constructed in relation to characteristics of the children, community, or subject matter. One of the findings suggested that the format of most of the lessons was a reflection of current practice in the school as used by cooperating teachers. It is suggested that the student teachers tended simply to borrow the practices they saw, rather than creating original tactics.

Kapfer, Miriam B. "Behavioral Objectives and the Gifted," Educational Technology, June 15, 1968, pp. 14-15.

This article deals with the means of operationalizing the general goals of education (1) for initial curriculum planning for the gifted; (2) for on-going efforts to individualize instruction in the gifted program, and (3) for later evaluation of the effectiveness of the program. The ideas concerning intellectual abilities are stated behaviorally so that a teacher can plan effectively for materials, methods, and evaluation. In other words, the behavioral objectives listed below relate to the broad goals involved in maximum development of a child's intellectual abilities. The statements presented represent a behavioral point of departure for classroom teachers in augmenting and communicating district-level goals to students.

Kapfer, Philip G. "Behavioral Objectives in the Cognitive and Affective Domains," Educational Technology, June 15, 1968, pp. 11-14.

"The purpose of this article is to report approaches to the cognitive and affective domains currently being developed and used with students as part of a Title III, PACE project at Ruby S. Thomas Elementary School in Las Vegas, Nevada. The approach reported in this article should prove useful to teachers and curriculum developers as an initial step in assisting a student to learn a behavior and to evaluate his own attainment of that behavior." A continua of behaviors based on reasonably spaced steps is presented; "Continua of skill behaviors with affective implications provide the learner with attainable step-wise models which he can practice. As a result, he possibly will come to hold the related level of attitudes."

Kearney, Nolan C. "Goals of Elementary Education," The National Elementary Principal, Vol. 34, October, 1954, pp. 12-14.

Kearney's article bases its statements on the book Elementary School Objectives published in 1953 by the Russell Sage Foundation. The tendency appears to be to add to the "old-fashioned" fundamentals a new cluster of learnings about which educators and parents are becoming increasingly aware. The Mid-century Committee on Outcomes in Elementary Education present nine general curriculum areas regarding educational philosophy and the implications of new research in education. In each of these curriculum areas, four types of behavioral changes are discussed. This article and the study it refers to are a new approach to the problems of elementary education. A listing of the nine curriculum areas and four types of behavioral changes is provided.

Kearney, Nolan C. Elementary School Objectives. New York: Russell Sage Foundation, 1953.

Consultants and critics attempt to prepare lists of goals for the elementary school in terms of observable human behavior in order to facilitate measurement and evaluation. The principal aim is to present a revealing discussion of obtainable objectives rather than to deal with problems of curriculum or instructional methods.

Kennedy, John L. "Psychology and System Development" in Psychological Principles in System Development, Robert M. Gagné (ed.). New York: Holt, Rinehart and Winston, 1962, pp. 13-32.

An overview of the role of the psychologist in system development and the methods he uses for specification purposes.

Krathwohl, D. R. "Stating Objectives Appropriately for Program, for Curriculum, and for Instructional Materials Development," The Journal of Teacher Education, Vol. 16, 1965, pp. 83-92.

This article states that there is a need for objectives at several levels of analysis. First, there are general statements of programs of instructions, the next level is the behavioral in which broad goals are broken down into specific building blocks for curricular instruction, and finally, the level needed to create instructional materials. The Taxonomy of education is divided into three domains, the cognitive, the affective, and the psychomotor. The cognitive deals with the objectives having to do with thinking, knowing and problem solving. The affective deals with objectives concerning attitudes, values, interest, appreciation and social emotional adjustment. The psychomotor domain covers objectives having to do with manual and motor skills.

Krathwohl, David R. et al. Taxonomy of Educational Objectives (The Classification of Educational Goals), Handbook II: Affective Domain. New York: David McKay Company, Inc., 1956.

Recognized is the need for identifying and classifying objectives concerned with the affective domain. The book is composed of two parts. Part I explains what is meant by the term "affective domain" and its classification structure. Part II explains the classification structure in more detail with illustrative educational objectives and illustrative test items. Appendix A contains a condensed version of the affective domain.

Krathwohl, David R. "The Taxonomy of Educational Objectives: Its Use in Curriculum Building." In C. M. Lindvall (ed.), Defining Educational Objectives. Pittsburgh: University of Pittsburgh Press, 1964.

The value of the Taxonomy in Curriculum Construction is discussed. Major uses include: (a) It provides a basis for working with objectives with a specificity and a precision that is not generally typical of such statements. (b) This specificity in the description of student behavior makes it easier to choose appropriate learning experiences and evaluation instruments. (c) It provides a range of possible outcomes that may suggest additional goals that might be included. (d) It provides for a comparison of objectives from curriculum to curriculum. (e) It might suggest a hierarchy of learning experience. (f) It provides a structure for analyzing test items

(both standardized and teacher-made) for comparison with curriculum objectives.

Lang, Carl J. and Robert V. Katter. "A Method for Studying Leadership." Paper read at meeting of American Psychological Association, Director of Research, Human Resources Research Office, The George Washington University, 1959.

A method was developed for studying behavior of the formal leader in small groups. The method was designed to provide a set of behavior description variables which were comprehensive and stated in terms of overt behavior. Descriptions of observed leader behavior were obtained in interviews with subordinates. A set of behavior variables was formulated, and trained scorers transformed the interview data into quantitative information on these variables according to an objective set of rules. Final scores derived from this quantitative information yielded distributions showing substantial variation among leaders for most variables.

Lennon, Roger T. "Assumptions Underlying the Use of Content Validity," Educational Psychological Measurement, Vol. 16, No. 3, 1956, pp. 294-304.

Discussion of three assumptions underlying the notion of content validity: (1) The area of concern to the tester can be conceived as a meaningful, definable universe of responses. (2) A sample can be drawn from this universe in some purposive, meaningful fashion. (3) The sample and the sampling process can be defined with sufficient precision to enable the test user to judge how adequate performance on the sample typifies performance on the universe.

Lessinger, Leon N. "Test Building and Test Banks Through the Use of the 'Taxonomy of Educational Objectives.' " California Journal of Educational Research, Vol. 14, No. 5, 1963, pp. 195-201.

The Taxonomy can be utilized to upgrade classroom test construction. Teachers in the Grossmont Union High School District are instructed in the use of the Taxonomy and, subsequently, use the categories to aid in the construction and revision of test questions. A by-product of this approach has been the collection of 556 carefully prepared geography test items. Similar test banks are being prepared in English, Social Studies, Foreign Languages and Mathematics.

Lewy, Arieh. "The Empirical Validity of Major Properties of a Taxonomy of Affective Educational Objectives." The Journal of Experimental Education, Vol. 36, No. 3, Spring, 1968.

This article presents a study which attempts to illustrate certain methodological problems involved in the general study of models. The specific schema chosen for analysis is the Taxonomy of Educational Objectives: Affective Domain, a companion to the Taxonomy of Educational Objectives: Cognitive Domain developed by Bloom, et al. The general issue handled is the validity of the Taxonomy and the empirical analyses provided to validate the constructs of the Affective Taxonomy and also encourage their inclusion within the lexicon of current educational terms.

Lindquist, E. F., "The Selection of Objectives" in Educational Measurement, E. F. Lindquist (Ed.), Washington: American Council of Education, 1951.

The educational objectives are to be found on pages 121-127; 137-138; 655. The author states that: (a) Most tests are based upon immediate objectives without regard to the entire educational program, or social utility. (b) The objectives of individual student guidance and of curriculum have been seriously neglected. (c) Many of the test builders feel that it is not their business to bring about changes in the curriculum. (d) These types of tests should no longer occupy so dominant a place in the educational scene. (e) Many educational limitations are due to the emphasis on content objectives. (f) There is a need for tests of hitherto unmeasured educational objectives.

Lindvall, C. M. Testing and Evaluation: An Introduction, New York: Harcourt, Brace, and World, Inc., 1961.

Chapter Two of this book is concerned mainly with defining educational objectives. The author divides the chapter into four main parts. These include: The Need for Objectives, The Sources of Educational Objectives, The Derivation of Specific Objectives, Objectives Should Cover a Variety of Types of Learning. A summary is provided at the end of the chapter.

Lindvall, C. M. and John L. Bolvin. "Programmed Instruction in the Schools: An Application of Programming Principles in Individually Prescribed Instruction", Sixty-Sixth Yearbook of the National Society for the Study of Education, Part II. Chicago: The University of Chicago Press, 1967.

This paper is designed to describe the rationale behind the I.P.I. (Individually Prescribed Instruction) program in the Baldwin-Whitehall School District, Pittsburgh, Pennsylvania. Steps leading to an effective Individually Prescribed program are presented and discussed. The first step listed suggests that objectives must be spelled out in terms of desired pupil behavior. Several basic hypotheses underlying the development of Individually Prescribed Instruction are presented and elaborated on. These hypotheses are: (a) Learning is something that is personal and individual; (b) The same type of planning and "programming" that is employed in a programmed textbook can be used to develop a more extensive program which extends over grade lines, covers at least all of the elementary-school years, and involves a much greater variety of learning experiences than can be presented in a textbook; and (c) If principles of programming were applied, the desired flexibility in rates of pupil progress would not involve any plan for "special promotion," for "retentions", or for any type of complex grouping or regrouping. It is pointed out in the paper that the impact of this approach to instruction in the public schools has been gradual. Lindvall believes that one of the reasons for this gradual impact is due to the tendency on the part of the schools "to adopt programmed materials instead of the principles of programmed instruction."

Lipson, Joseph L. "Individualized Instruction in Elementary Mathematics Education." Research in Mathematics Education, Washington, D.C.: National Council of Teachers of Mathematics, 1967.

The purpose of this paper is to describe an experimental program designed to allow each child to progress through the curriculum at his own rate and to reach objectives

by means of tasks assigned on the basis of his unique abilities.The basic components of the program that are discussed at length in this paper are: (a) a sequential curriculum stated in terms of what the student is expected to do at each stage; (b) placement and diagnostic tests to determine what instruction shall take place; and (c) lessons (e.g., work-page assignments or teachers directed activities.) The paper states that a list of objectives was categorized by topic, such as addition or multiplication, and sequenced according to difficult and prerequisite conditions. Implications of this study are: (a) the greater variability of student achievement in the classroom or school, the greater the potential of an individualized system. Thus, the general approach may be most useful in school districts which are undergoing integration or which, for other reasons, have large spreads in student ability; and (b) a system of continuous revision of curriculum materials, based on student performance, is a highly desirable way to avoid obsolescence of instructional materials and to arrive at effective working materials.

Lipson, Joseph L. et al. "The Development of an Elementary School Mathematics Curriculum for Individualized Instruction." Learning Research and Development Center, University of Pittsburgh, Pittsburgh, Pennsylvania, 1966. (Mimeographed Report.)

The role of curriculum objectives in the individual program, modification of objectives by lesson writers, modification of objectives for communicating with non-readers, the need for and strength of behavioral objectives and the effect of individualization are topics discussed in this paper. In addition, examples of mathematical units written in behavioral terms are presented.

Lombard, John W. "Preparing Better Classroom Tests." The Science Teacher, 1965, pp. 33-38.

There may be many ways to prepare good tests, but few seem to offer as clear guidance as the objectives in the cognitive domain as outlined in the Taxonomy of Educational Objectives. He is using the material of the taxonomy to frame a functional guide to the construction of better classroom tests. Each category--knowledge, comprehension, application, analysis, synthesis, and evaluation are described briefly, and general types of questions which test this category are suggested.

Lupold, Harry F. "Education with Meaning: A Comprehensive High School in Action." Clearinghouse, Vol. 41, March, 1967, pp. 440-441.

The role of the school and its educational objectives are discussed in relation to the technological revolution and working students. Examples and statistics are from the Willoughby-Eastlake City Schools, Eastlake, Ohio. There is a presentation of the realistic goals a teacher should reach in order to help all students. Special consideration is given to history course objectives and teaching methods.

McAulay, J.D. "Criteria for Elementary Social Studies," Educational Leadership, April, 1968, pp. 651-655.

The issues of social studies programs and their objectives are under examination in this article. The article presents standards to serve as guidelines to determine the

pertinence of a new social studies program: (1) Is the social studies program so constructed that its focus is the involvement of children; (2) Is the new social studies program expandable; (3) Does the social studies program contain modern social problems which the child can comprehend; (4) Is the social studies program objective; (5) Does the social studies program help the child to hold multiple loyalties? It seems essential that a modern social studies program for the elementary school must meet one or more of these criteria if it is to be effective for the child of the space age.

MacDonald, James B., Dan W. Andersen, Frank B. May. Strategies of Curriculum Development, The Works of Virgil E. Herrick, Ohio: Charles E. Merrill Books, Inc., 1965.

Objectives do not solve all the problems of developing significant educational programs for children, but they do have some very definite jobs to perform. In this excellent chapter on "Establishing and Using Objectives", the author focuses attention upon the ways of considering objectives, the function of objectives, the statement of objectives and the definition of objectives.

He gives excellent examples, sample problems and charts to further understanding of the topic.

Mager, Robert F. Preparing Instructional Objectives. Palo Alto, California: Fearon Publishers, 1962.

The book indicates the importance of having meaningful objectives in education so as to facilitate the intended outcome that the instructor had in mind. The objectives should identify the terminal behavior by name, and define the desired behavior by describing them. Then it must specify the criteria of what is acceptable performance by the learner. Thus, a meaningful objective is one that succeeds in communicating the instructional intent of the material to be learned.

Mager, Robert Frank. Preparing Objectives for Programmed Instruction. San Francisco, California: Fearon Publishers, 1961, pp. 62.

A presentation in scrambled book form, of three criteria for clearly stated objectives: Behavioral statements, a statement of the conditions under which the behavior is to be observed, and a standard of accuracy or speed that the behavior must reach.

Maguire, Thomas O. "Value Components of Teachers' Judgments of Educational Objectives," AV Communication Review, Vol. 16, No. 1, Spring, 1968, pp. 63-74.

Article dealing with the uses and value of educational objectives. Specifically, the study had four purposes: (1) To suggest a set of verbal labels which describe the value attributed to educational objectives by teachers; and to group these labels into more parsimonious clusters, or value aspects; (2) To suggest a model of decision-making behavior which relates teachers' assessments of the value of an objective to a set of hypothetical decisions about the objective; (3) To group teachers into homogeneous decision-making groups; (4) To search for biographical characteristics which differentiate the groups found in Item No. 3.

Marsh, C. S. American Universities and Colleges, Washington D.C.: American Council on Education, 1936, pp. 7-8, 17, 31, 47-49.

Marsh is concerned with the objectives of primary and secondary education, colleges, universities, graduate schools and professional schools. A little attention is given to each level of the educational sequence. Definition and objectives of a college and university are also offered.

May, Kenneth O. "Programming and Mathematics Teaching," Education Digest, Vol. 32, October, 1966, pp. 38-41.

The various types of programming are discussed, especially SCE-Programming (programming in the Skinner, Crowder, or eclectic modes). The issue raised is how, when, and by whom should learning be programmed. Specific claims of the SCE programmed materials are examined. "Mathematical education would benefit most from the programming movement if we took seriously, the call for specification of objectives and design of teaching systems to achieve them."

McFann, Howard F. "Individualization Of Instruction." Paper read at Human Factors Research and Development Conference, Fort Benning, Georgia, October, 1966.

This presentation reviews the trend in research and practice, away from individualized instruction in the army (i.e., away from training programs geared to the individual learner). Approaches to meeting the conditions of individualized instruction are suggested in terms of specification of training objectives, assessment, and instructional methods and media. A break away from the fixed time, single treatment training program is advocated.

McGrath, Joseph E., Peter G. Nordlie and W. S. Vaughan, Jr. "A Systematic Framework for Comparison of System Research Methods," Report No. 1, Human Sciences Research, Inc., Arlington, Virginia, March, 1960, pp. 66.

Development of a tentative conceptual framework for the classification and comparison of system research methods. This report evaluates the feasibility of the proposed approach for an over-all integration of system research methodology.

McMurrin, Sterling M. "What Tasks for the Schools?" Saturday Review, January 14, 1967, pp. 40-43.

The article is concerned with problems of means and ends in education. He feels we are failing to come to grips with the problems of aims and purposes and to define adequately the proper functions of schools. He goes into much detail on a school defining its purposes and what these objectives might be first before trying to contribute to the welfare of many.

Three primary functions of instruction, cognitive, affective and conative functions are defined. Examples of subject areas and instruction are presented carefully in each area.

McNeil, John D. "Antidote to a School Scandal." Kappa Delta Pi, November, 1966.

"Supervision by Objectives" is the name given to a procedure for evaluation of teachers. This procedure suggests that supervisors and teachers set up clearly stated learning objectives. The point is stressed that educational objectives must be operationally defined.

McNeil, John D. "Concomitants of Using Behavioral Objectives in the Assessment of Teacher Effectiveness." Journal of Experimental Education, Vol. 36, No. 1, 1967, pp. 69-71.

This paper describes a study designed to determine whether supervision of teachers by objectives (i.e., focus upon results) would have the following consequences: (a) Supervisors will perceive teachers as more effective in classroom instruction; (b) Pupils will show greater gain in the desired direction when the teacher's reinforcement is contingent upon such gains; and (c) Teachers will perceive supervisors' suggestions as more relevant and helpful. Several experiments were conducted to test the above hypotheses and the findings are discussed in the context of the article. One of the findings suggested that although teachers tend to see their supervisor's suggestions as helpful, both when results are the criterion and when teaching method, personality and other evaluative bases are operatives. Teachers are almost unanimous in believing that the criterion "results in terms of pupil gains" is the best of five bases for evaluating instructional effectiveness.

Melching, William H. and Harry L. Ammerman. The Derivation, Analysis and Classification of Instructional Objectives, Technical Report No. 66-4, Human Resources Research Office, The George Washington University, 1966.

An examination of the methods, terms and criteria associated with the determination of student performance objectives was made in order to synthesize and apply the relatively new developments in Human Factors research on this subject. Educational and training research literature on the subject was examined to identify procedures currently being used or proposed. A survey of eight army service schools was conducted to determine procedures employed by instructional personnel in determining course content. On the basis of data obtained, important problems arising in connection with the development of objectives are identified and analyzed. A system for analyzing instructional objectives by identifying factors that influence their meaningfulness and usefulness was developed. Types of student performance objectives are listed, and a classification scheme for terminal objectives is suggested. The classification is based on five factors on which a statement of an objective may vary, affecting the nature of the student action description and the communicability of the statement itself. The variety of terms associated with objectives is discussed.

Melching, William H. et al. Deriving, Specifying and Using Instructional Objectives, Professional Paper 10-66, Human Resources Research Office, The George Washington University, Virginia, December, 1966.

Papers based primarily on research conducted on methods for deriving objectives. The purpose was to consider some problems frequently encountered when preparing instructional objectives and to discuss several means by which future efforts at implementation might be facilitated.

Melching, William H., et al. A Handbook for Programmers of Automated Instruction, U.S. Army Air Defense Human Research Unit, Fort Bliss, Texas, September, 1963.

The organization of the content of this handbook parallels the sequence of activities which a programmer should follow in preparing an instructional program. The first concern is that of the development of objectives. Remaining chapters deal with the formal test and evaluation of a program.

Melching, William H. "In Defense of Instructional Objectives." Symposium. The George Washington University, Human Resources Research Office, Alexandria, Virginia, 1966.

Instructional objectives that are stated in terms of the performance expected of a student upon completion of instruction are intended to communicate to both students and teachers. Sample objectives, a history of the development of ideas about objectives, and methods of preparing suitable objectives are given.

Melching, William H. et al. The Text of an Orientation Workshop in Automated Instruction. Human Research Unit, Fort Bliss, Texas: July, 1962, pp. 85.

Outline of the major features of technology of training, including determination of training objectives, principles of lesson preparation, and proficiency quality control.

Miller, James Nathan. "New Cure for Boredom in the Classroom," The Reader's Digest, May, 1966, pp. 171-172. Condensed from the PTA Magazine.

This article is concerned with high school students who are bored with classes seemingly meaningless to them. The need for more specific objectives is implied.

Miller, Robert B. "Analysis and Specification of Behavior for Training" in Training Research and Education, Robert Glaser (ed.). Pittsburgh: University of Pittsburgh Press, 1962, pp. 31-62.

A general discussion of the job and task analysis in which the following aspects of the collection and organization of task information are described: Source and organization, determining consequences of task performance, identifying system input conditions, preparing flow diagrams of tasks in typical job cycles, preparing step-by-step statements of position elements in each task, and describing decision-making tasks.

Miller, Robert B. "Some Working Concepts of Systems Analysis", American Institute for Research, Pittsburgh, February, 1954, pp. 6.

A general report of human factors in system analysis. A diagram is presented showing the variables in a single-operator, man-machine system. The report states that the most important feature of systems thinking is probably that it is oriented toward the output requirements, or goals, of the system; of next importance is emphasis on the variety of conditions under which the system will be required to operate.

Miller, Robert B. "Task Description and Analysis," Psychological Principles in System Development, Robert M. Gagné (ed.). New York: Holt, Rinehart and Winston, Inc. 1962, pp. 187-299.

Task analysis, defined as the detailed study of the behavioral requirements of tasks. This is a discussion of goal orientation and set; reception of task information (short term, long term, and memory for codes); interpretation and problem solving; and the implications of task analysis for training.

Monroe, W. S. Directing Learning in the High School. Garden City, N.Y.: Doubleday, Doran & Co., Inc., 1927, pp. 51-114, 539-570.

Chapter III deals with the teacher's objectives. It treats the objectives of the high school, the form these objectives should be formulated in, and determination of the compatability of learning exercises and objectives. Illustrations are provided. Chapter IV considers the question of how the teacher may stimulate his students through different needs and interests. Used also are praise and reproof. Chapter XVII is concerned with the planning of teaching or the "lesson plan" on a high school level. Illustrations are provided.

Monroe, W. S. Measuring the Results of Teaching, New York: Houghton Mifflin Co., 1918, pp. 267-280.

In Chapter XI, Monroe speaks of the value of aims and cites evidence to illustrate the lack of definite aims. He also cites objectives to present courses of study with respect to aims. He also shows how standardized tests can be used in setting the aims and objectives for a teacher.

Monroe, W. S. and M. D. Engelhart. The Scientific Study of Educational Problems, New York: The Macmillan Co., 1936, pp. 411-413, 419-435.

In the chapter "Determining What Should Be" the authors state that in considering problems of purpose, a question of means and objectives must first be answered. They also mention objective techniques in the problem of curriculum construction. A distinction is made between remote or ultimate objectives and immediate objectives.

Monroe, W. S., D. A. Hindman and R.S. Lundin. "Two illustrations of Curriculum Construction," University of Illinois Bulletin, Vol. 25, No. 26, Bureau of Educational Research Bulletin, No. 39, University of Illinois, Urbana, 1928, pp. 53.

The illustrations of curriculum construction described in this monograph involve little or no use of objective data. The procedure employed may be described as "systematic

and critical judgment." In both cases, the first major step was to formulate an analytical description of the ultimate or conduct objectives for which the proposed curriculum was considered to contribute equipment. From these conduct objectives, the immediate or control objectives were derived. The last two steps include the predicting of the learning activities necessary for acquiring the specified controls of conduct, and the learning exercises that will serve as efficient bases for these activities.

Monroe, W. S., C. W. Odell, M.E. Herriott, M. D. Englehart, and M. R. Hull. "Ten Years of Educational Research, 1918-1927," Bureau of Educational Research, College of Education, University of Illinois, Urbana, 1928, No. 42, pp. 116-138.

Chapter V deals exclusively with curriculum research which is the determination of objectives, materials of instruction, and learning exercises. Types of curriculum research may be classified into five categories: (1) Activity analysis; (2) Determination of consensus of opinion; (3) Determination of consensus of school practice; (4) Analysis of textbooks and (5) Determination of pupil reactions. There is detailed discussion of each of these.

Monroe, W. S., and O. F. Weber. The High School, Garden City, New York: Doubleday, Doran & Co., Inc. 1928, pp. 122-226, 437-467.

Chapters V and VI attempt to provide a fundamental and detailed exposition of the aims and objectives of the American high school. Chapter V contains the basis for conduct objectives and Chapter VI provides a relation of control objectives to conduct objectives. Chapter VII deals with the curriculum and its construction so as to motivate the student and prepare him for post graduate life. Examples are provided. Chapter XVI explains the guidance function of the high school. It asks "What are the guidance objectives of the high school and how should it endeavor to obtain these objectives."

Montague, Earl J. and David P. Butts, "Behavioral Objectives," Science Teacher, Vol. 35, March, 1968, pp. 33-35.

Behavioral objectives as a term is first defined, followed by a description of how objectives are stated. Next, the article deals with the actual writing of behavioral objectives and the characteristics that are desired in this process. The validity of educational objectives is then discussed. The article is written in an atmosphere of concern for the student. The article was delivered by Dr. Montague at the N.S.T.A. Regional Conference in Cincinnati on November 3, 1967.

Muthersbaugh, G. C. "Objectives of a Proposed Course of Study in Physics for Senior High Schools," School Science and Mathematics, Vol. 29, December, 1929, pp. 743-54.

Four texts in high school physics and four courses of study were selected for analysis on the basis of the judgments of sixteen leaders in the field of physics teaching. These sources were examined for objectives, an objective being defined as "a specific goal expressed in terms of useful life situations." The analysis resulted in 1,018 slips, each containing a stated objective. The study exemplifies the inadequacy of "objective" data in curriculum research.

NEA Research Division. "A New Look at the Seven Cardinal Principles of Education," Journal of the National Education Association, Vol. 56, January, 1967, pp. 53-54.

This is a Commission report verifying the inclusion of seven principles established in 1918, into our present educational system. The seven principles were and are (1) health, (2) command of fundamental processes, (3) worthy home memberships, (4) vocation, (5) citizenship, (6) worthy use of leisure, (7) ethical character.

Nuthall, Graham. University of Illinois Project on the Strategies of Teaching. United States Department of Health, Education and Welfare, Office of Education, Cooperative Research Project, No. 1640.

Strategies of Teaching was a project concerned primarily with developing a method of documenting and analyzing the ways in which teachers and students shift from point to point and from topic to topic during the discussion which occurs in a continuous sequence of class lessons. The data on which the analysis has been based was of transcribed recordings of five consecutive lesson periods from each of seventeen high school classes in such subject areas as English, American and World History, Chemistry, Physics, Sociology and Mathematics. Several strategies for analyzing the way teachers handled particular topics in the classroom are presented with the results.

Ohnmacht, Fred W. "Factor Analysis of Ranked Educational Objectives: An Approach to Value Orientation," Educational and Psychological Measurement, Vol. XXV, No. 2, 1965.

The purpose of this study is to (1) investigate the utility of factor analysis of ranked educational objectives for the purpose of identifying value orientation in terms of the relative importance, attributed to educational objectives as contained in a selected list and (2) to identify the value orientation, within the context of a sample of objectives, of a College of Education faculty. This is a well handled, topical and subtitled study.

Paulson, Casper F. Slide Presentation on Writing Behavioral Objectives. Monmouth, Oregon: Teaching Research Division, Oregon State System of Higher Education.

A slide presentation accompanied by a narrated tape to be used as a teaching process in learning how to write behavioral objectives.

Paulson, Casper F. "Specifying Behavioral Objectives." National Research Training Institute Manual for Participants in Research Development (CORD) Projects. Monmouth: Teaching Research Division, Oregon State System of Higher Education, August, 1967. Part II, pp. 1-13.

Two methods for instructing teachers to construct behavioral objectives are discussed in this report. One method utilized a "rational analysis" technique (determine prerequisite knowledge and skills and arrange their sequence in a rational order) to analyze learning tasks. This technique was compared with a "self-sequencing" technique in which teachers who were unskilled in constructing behavioral objectives could request each prerequisite section in the order desired. Results of this experiment indicated that the "self-sequencing" procedures did not dictate a sequence different

from the "rational analysis" technique. Paulson then arbitrarily rearranged those sections where no clear sequential preference was indicated to produce a sequence of instruction that was maximally different. While differences approached significance favoring the later mode, it was concluded that "possible differences in performance suggest variability of performance effects with variation of sequence, rather than superiority: of the latter mode."

Paulson, Robert F., Objectives of Education in, American Education - Challenges and Images, The University of Arizona Press, 1967.

Essentially, educators and the public have always agreed that the basic responsibility of the schools is to develop the mind. But, they also agree that the overall mission of the schools has been enlarged. Schools are now asked to help each child become as good and as capable in every way as native endowment permits, to help children acquire any skill or characteristics which the community deems worthwhile. In addition to intellectual achievement, the schools are asked to foster morality, show the road to happiness, and teach any useful ability.

Peters, C. C., Objectives and Procedures in Civic Education, New York: Longmans, Green and Co., 1930, pp. 302.

Chapter IV contains a "Blue Print of an Optimum Citizen" made up of short statements of the objectives of education for citizenship as derived from over a thousand separate studies made by the author and his students. Included are suggestions of possible means and occasions for training to meet these objectives.

Pfeiffer, Isobel and O. L. Davis, Jr. "Teacher-Made Examinations: What Kinds of Thinking Do They Demand?" Bulletin of the National Association of Secondary School Principals. September 1965, Vol. 49, pp. 1-10.

The taxonomic classification of test items in the semester examinations of 9th grade teachers was studied. Percentage of items in each of the six major categories were compared across courses, ability group levels, and programs of study. In all cases, the highest percentage of questions fell into the knowledge category. Second highest was Application. Very few questions were classified into the upper three categories, and these were found primarily in some English courses. It was suggested that teachers should be aware of which cognitive processes they are emphasizing in their test questions, and that there should be more emphasis on the higher objectives for all students in all courses. Also, a study should be made of teaching emphasis; are they the same as those of the examination questions?

Pfeiffer, Isobel L. "Teaching in Ability Grouped English Classes: A Study of Verbal Interaction and Cognitive Goals." Journal of Experimental Education, Vol. 36, No. 1, 1967, pp. 33-38.

Five teachers who each taught classes of two different ability levels were used as subjects in this study. Teachers were interviewed to obtain estimates of their emphasis on different cognitive goals. Teacher-made tests were then analyzed according to cognitive goals inferred by the test items, using the Taxonomy. Findings include the

following: (a) Teachers emphasized less complex skills in lower ability classes; (b) Test items also revealed differentiations of cognitive goals for different ability classes; and (c) Teachers generally indicated they felt one pattern of cognitive goals was important, but tested for another.

Popham, W. James. "Probing the Validity of Arguments against Behavioral Goals." Paper read at the Annual American Educational Research Association Meeting, Chicago, February, 1968.

This paper was designed to react to the intense debate that has developed in the field of curriculum and instruction regarding the merits of stating instructional objectives in terms of measurable learner behaviors. Eleven reasons given by educators in opposition to objectives stated in terms of measurable learner behaviors are presented. These opposing reasons are then discussed by Popham with an emphasis on demonstrating, by example, their invalidity. Popham attempts to prove that none of these reasons should be considered strong enough to deter educators from specifying all of their instructional goals in the precise form required for writing behavioral objectives.

Popham, W. James. Educational Objectives, a filmstrip-tape program produced by Vimcet Associates, Los Angeles, California, 1967.

A program which can be used with those who are learning how to teach and individuals who are already experienced teachers, but are interested in improving their teaching proficiency. Film-strips are coordinated with the audio tape emphasizing the identification and use of behavioral objectives.

Popham, W. James and Eva L. Baker. "Curriculum Principles for Prospective Teachers." Teacher Education Quarterly, Vol. 22, 1965, pp. 38-41.

Two groups of prospective secondary school teachers were exposed to different approaches to principles of curriculum construction. One group: (I) studied a five point rationale suggested by Tyler for selecting instructional objectives; the other group: (2) studied principles based on the Taxonomy. One prediction made by the investigators was that group (2) would select a greater proportion of objectives classified at higher levels of the Taxonomy. The data did not substantiate this prediction. The study in general indicated that the brief exposure to certain curriculum principles did result in some differences in the responses of the two groups.

Powers, Theodore R. "The Development of a Basis for a Common Core Curriculum." Paper read at meeting of American Psychological Association, Director of Research, Human Resources Research Office, Fort Benning, Georgia, 1965.

It was determined by a survey of General Military Science course graduates that these junior officers are assigned many different types of duties, all showing a relatively low frequency of occurrence. The extension range of assignments precluded the possibility of using any type of classical role analysis to identify knowledges and skills for a particular role. In partial fulfillment of the ultimate goal of determining training objectives for the GMS Curriculum of the Army ROTC program, a method was

developed to identify common knowledge and skill areas of various roles that could be included under seven essential training dimensions. These common knowledge and skill areas were assigned a numerical rating based on frequency of appearance in role analysis literature and also frequency of assignment for ROTC graduates. Those areas having a high rating, and determined to be appropriate for ROTC instruction, will be expanded and clarified as a means of developing training objectives for the ROTC program. This detailed set of duty-oriented training objectives could then be used as a basis for curriculum development.

Raths, James D. "Specificity as a Threat to Curriculum Reform." Paper read at the Annual American Educational Research Association Meeting. Chicago, February, 1968.

This paper is a counter-argument to the logic supporting the idea that curriculum developers must write specific objectives. The argument is based on the observation that teachers and curriculum workers generally are not writing specific objectives for use in classrooms. Raths hypothesizes that most teachers are found on the idealistic and humanistic side of a values continuum. His presentation in support of the above hypothesis concentrates on the fact that specific objectives (equated with limited goals) are both unappealing and antagonistic to the spirit of humanitarianism that attracts so many teachers to the profession. Raths suggests that a compromise between rigid specifications and no specifications is needed. He suggests that a new criteria must be developed that will allow teachers to write objectives in a way that is more specific than is now the case, and yet in a manner congruent with their values.

Remmers, H. H., N. L. Gage, and J. Francis Rummel. A Practical Introduction to Measurement and Evaluation, 2nd ed. New York: Harper and Row, 1965, pp. 181-207.

Chapter 7 deals with the identification of educational objectives. They may be classified as general and specific objectives. Both are necessary in any clear formulation of objectives, since the achievement of general objectives depends upon the contributions made by each specific factor. There is a brief discussion on the desirable form and content for statement of objectives; one being "objectives should be worded in terms of changes expected in the pupil rather than as duties of the teacher." Illustrations of objectives are given, followed by a discussion of the Taxonomies of Educational Objectives, Cognitive Domain and Affective Domain. The value of student participation in evaluation of self is also stressed.

Romberg, Thomas A. "The Development of Mathematics Achievement Tests for the National Longitudinal Study of Mathematical Abilities." Leland Stanford Junior University, 1966. (Mimeographed Report).

Content validity was a concern in the development of mathematics achievement tests. Units of subject matter were identified and the behaviors included in each unit were classified using the Taxonomy as a starting point. The resultant matrix of mathematical behaviors served as a table of specification for test construction procedures.

Romberg, Thomas and Jeremy Kilpatrick. "Preliminary Study on Evaluation in Mathematics Education." Leland Stanford Junior University, 1966. (Mimeographed Report).

A seminar group listed objectives of Mathematics Education for grades K-12 and wrote sample test questions to illustrate the various topics in the curriculum. The topics were then classified according to the Taxonomy categories. A set of 50 test items classified according to content and behavioral skills are presented to illustrate the various levels of the Taxonomy by topic in the curriculum.

Sand, Ole. "Schools for the 70's." The National Elementary Principal, Vol. 47, No. 1, September, 1967.

This article was an attempt to explain what direction education must turn to by the 1970's. Four specific areas were outlined along with the significance of the trends in decision-making, deciding what to teach, organizing schools and classrooms, and evaluation and assessments. It provides the students a chance to help plan out their goals. The role of the schools then should not be purely academic, but should provide social aspects as well. Objectives were suggested as to how to evaluate what changes in human behavior have actually been realized.

Scannell, D. P. and W. R. Stillwagen. "Teaching and Testing for Degrees of Understanding." California Journal of Instructional Improvement. 1960.

The Taxonomy was used to classify both educational objectives and final examinations collected from high school Chemistry teachers in order to compare the relationship between the statements and the measurement of the objective. Findings include: (a) Over 50% of the objectives and 60% of the test items related to accumulation of knowledge; (b) Very seldom were students required to exhibit complex cognitive skills (understanding of various degrees) on final examinations; and (c) There was seldom a direct relationship between the levels of stated goals and the levels of required examination behavior.

Schaefer, Sister Mary Geralda. "Revision of Secondary Mathematics in a Selected Number of Schools," The Mathematics Teacher, Vol. LXI, No. 2, February, 1968, pp. 157-61.

A small portion of this article (pp. 160-161) deals with mathematics courses, their organization, objectives, and content. The objectives of the thirteen schools studied were aimed at satisfying the recommendations of the college entrance examination board. This is supported by the fact that most textbooks used in these schools bear recent copyright dates and reflect the thinking and recommendations of curriculum revision groups.

Shriver, Edgar L. "Determining Training Requirements for Electronic System Maintenance: Development and Test of a New Method of Skill and Knowledge Analysis," Technical Report 63, Human Resources Research Office, Alexandria, Virginia. (Published in Washington, D.C.), June 1960, reissued in August, 1963, pp. 100.

A study of work done in conducting task analysis for jobs prior to the existence of job incumbents, necessitating the analysis of the job from production information rather than from a survey of activities of job incumbents. The general procedure developed is called "cue-response analysis," in which job tasks are broken into the appropriate cues

and responses. The net result of this procedure is that fewer skills and knowledges than are commonly specified are required for a man to perform his job satisfactorily, thus reducing training time.

Simpson, Elizabeth Jane. The Classification of Educational Objectives: Psychomotor Domain, U.S. Department of Health, Education, and Welfare, Office of Education, Vocational and Technical Education Grant Contract No. OE 5-85-104. Urbana: University of Illinois, 1966, 35 pp.

A taxonomy for the "psychomotor" domain using some analyses of behavioral objectives and laboratory analyses of selected tasks. The main categories are Perception, Set, Guided Response, Mechanism, and Complex Overt Response.

Slack, Charles W. "The Politics of Educational Objectives," Educational Technology, July 30, 1967, pp. 1-6.

The role played by educational technology on educational objectives is first discussed. There is always a behavioral objective in any learning and they are constantly being achieved by learners in and out of school, in interaction with each other and, singly, in interaction with their environments. The establishment of educational objectives is discussed as a process primarily political and economic rather than scientific or disciplinarian. In essence, the article discusses what goes into the establishment of educational objectives from all angles.

Stake, R. E. "The Countenance of Educational Evaluation." Teachers College Record, Vol. 68, 1967, pp. 523-540.

The author notes two types of education evaluation, those being the informal and formal. The type under discussion in this article is the formal evaluation in which Stake develops a suggestive plan of evaluating the educational programs rather than the educational products. Through this approach, he attempts to develop a background for an evaluation plan. He also states that the "two basic acts of evaluation" are description and judgment. Stake feels that schools are out to employ measurement specialists to develop and evaluate their educational programs. He feels this way because he believes that the product of education depends on its program of use. Also mentioned is that in the evaluation report, one must consider the antecedent, transaction and outcome.

Stasiewski, Anne. "Setting a Course for Yourself and Your Students," Grade Teacher, Vol. 84, April, 1967, pp. 96-97.

In selecting objectives, the culture must be analyzed, the particular grade level for behaviors must be determined and there must be an open-endedness so that objectives will lead from grade to grade. There is then a more detailed look at the characteristics of specific objectives: "Each objective must be stated in clear and definite terms which define the type of behavior the lesson will help develop; statements should be pupil centered, worded in terms of what the pupil can do; and they should include the exact behavior a pupil is expected to exhibit, the content that will be involved, and the degree to which accuracy is expected."

Stoker, H. W. and R. P. Kropp. "Measurement of Cognitive Processes." Journal of Educational Measurement. Vol. 1, No. 1, 1964, pp. 39-42.

Two questions are investigated: Can judges agree in the cognitive processes which a test item is intended to measure? Can the imputed hierarchical structure of the Taxonomy be empirically validated? Interjudge agreement was found with respect to the classification of test items in the intended category. General support for the hierarchical structure of the Taxonomy is suggested by the date, however, a hypothesized factor structure was not supported by various factor matrices.

Suchman, Richard J. "Old Goals and New Perspectives," Instructor, Vol. 76, January, 1967, pp. 23+.

The article begins by establishing traditional goals and shows how the educational system resorted to "social-ego pressure" to have children learn what they are expected to learn. Education then proceeded to the progressive movement where the emphasis was on the individual. The guidance movement then appeared and children were directed in ways the experts considered best. The new goals set forth new meaning for a child without forcing him to give up his autonomy. Essentially, what has been established is a new role for teachers.

Taber, Julian I., Robert Glaser and Halmuth Schaifer. Learning and Programmed Instruction. Reading, Mass.: Addison-Wesley Publishing Co., Inc., 1965, Chapter 4.

This chapter deals with the necessity of having and defining objectives before a program can be developed. This will, in essence, determine the effectiveness of instruction, and provide the appropriate instruments for measuring the instructional goals when achieved. It is necessary to consider the program in terms of content and behavioral characteristics.

An outline giving the procedure for organizing and analyzing a program of instruction before its development is as follows: (1) Identification of terminal behavior; (2) Identification of entering behavior of student; (3) Formulation of measures of the achievement of criteria; (4) Specifications of content sub-topics; (5) Specifications of subject matter relationships; (6) Sequencing components for instruction; (7) Writing terminal frames.

Thomas, R. Murray. Judging Student Progress. New York: Longmans, Green and Co., 1954.

Chapter one deals with necessity for the educator to clearly state his objectives. Once this is done, teacher methods and student progress follow. Judging Student Progress introduces the in-service elementary school teacher to ways of evaluating children's growth in the classroom. The book differs in both style and content from many textbooks on evaluation. Each chapter begins with an actual classroom or school incident. Also, the writer presents the material in a very direct style, avoiding technical language.

Trow, Clark. "Behavioral Objectives in Education," Educational Technology, December 30, 1967, pp. 6-10.

The article opens with a discussion of objectives and their use. Maxims are then presented for proper utilization in providing directives for the formulator of

objectives: specificity and selectivity. Lastly, a detailed outline of how objectives should be written up and organized is illustrated: Content, Objectives, Media and Methods.

Twelker, Paul A. "Objective Analysis and Instructional Specification." National Research Training Institute Manual for Participants in Research Development (CORD) Projects. Monmouth: Teaching Research Division, Oregon State System of Higher Education, August, 1967, Part III, pp. 1-19.

This section is designed to make clear the philosophical issues involved in the design of instructional materials based upon criteria for writing behaviorally stated objectives.

Tyler, Louise L. "Symposium on the Instructional Objectives Controversy." Paper read at the Meeting of the National Council on Measurement in Education, 1968.

This paper focuses on: (a) the conception of education that underlies the definition and use of behavioral objectives; and (b) standards for stating behavioral objectives. Examples of objectives that are stated in behavioral terms are presented.

Tyler, Louise L. and Laura J. Okumu. "A Beginning Step: A System for Analyzing Courses in Teacher Education." Journal of Teacher Education. Vol. 16, No. 4, 1965, pp. 438-444.

A study of a teacher education program utilized the Taxonomy to classify course materials and examinations. Findings include: (a) A noticeable discrepancy between course descriptions and actual behaviors required; (b) A considerable emphasis upon knowledge type behaviors; and (c) A lack of attention given to develop certain important cognitive skills. The Taxonomy provided a useful structure for looking at course behaviors.

Tyler, Ralph W. Basic Principles of Curriculum and Instruction. Chicago: The University of Chicago Press, 1950.

This syllabus attempts to explain a rationale for viewing, analyzing, and interpreting the curriculum and instructional program of an educational institution. Especially thought-provoking is Chapter II, What Educational Purposes Should the School Seek to Attain. Selecting, stating and evaluating educational objectives is covered in an easy-to-read manner.

Tyler, Ralph W. "Evaluating the Elementary School," National Elementary Principal, Vol. 43, No. 6, May, 1964, pp. 9-13.

It is necessary to assess the educational objectives which the school has set for itself and the extent to which those objectives are actually being attained. At the most general level, all have similar objectives to enable every child to develop as fully as possible into a life-long learner. Objectives should be based on the realities of the situation within which the school must function. The educational objectives are those competencies which pupils are expected to acquire through learning. Thus, evaluating the results of the school requires information collected periodically regarding the extent to which pupils have acquired these competencies. A school's effectiveness is indicated by the changes which have taken place.

Tyler, Ralph W. "The Functions of Measurement in Improving Instruction" in Educational Measurement, Everett Franklin Lindquist (ed.). Washington: American Council of Education, 1951, pp. 47-67.

Evaluation as it assists in selecting objectives, content, learning experiences, and procedures of instruction, supervision, and administration. Conditions were described that were favorable to evaluation in helping instruction.

Tyler, Ralph W. "Some Persistent Questions on the Defining of Objectives" in Defining Educational Objectives, C. M. Lindvall (ed.). Pittsburgh: University of Pittsburgh Press, 1964, pp. 77-83.

Four questions which are often raised in discussion of the subject of educational objectives are discussed. The four questions are: (a) Why is it now considered important to define objectives clearly when teachers in the past have done excellent work without having a clear statement of goals? (b) What should be included in a clear definition of an educational objective? (c) What considerations should be taken into account in the selection of objectives? (d) What are the steps taken in the derivation of educational objectives? Reactions to these questions from the point of view of the administrator, teacher and student are provided.

Vaughn, K. W. "Planning the Objective List," Educational Measurement, Everett Franklin Lindquist (ed.). Washington: American Council on Education, 1951, pp. 159-184.

A chapter containing illustrations of how objectives should be analyzed to provide a basis for measurement in the fields of chemistry and reading.

Walbesser, Henry H. "Curriculum Evaluation by Means of Behavioral Objectives," Journal of Research in Science Teaching. Vol. 1, 1963, pp. 296-301.

This article initiates a program to develop instructional materials in elementary science for the early grades. The evaluation consists of three phases: the specification of the curriculum objectives as behaviors; the immediate measure of each of these specified behaviors by means of the check lists of competencies, and measures of the behaviors which characterize the processes of science. As a result of the first phase of the evaluation, a list of objectives is available. The second phase of the evaluation is intended to collect information on an immediate behavioral level that reflects the extent to which any given set of objectives are accomplished for any given exercise. The third phase of the evaluation answers the question of, "Whether the child's behavior has been changed with respect to the scientific processes such as observation, measurement, prediction, etc."

Whitmore, Paul G. "The Content Validity of Instructional Objectives." Symposium, The George Washington University, Human Resource Research Office, Alexandria, Virginia, 1966.

Instructional objectives are equated to specifications for test construction, which should lead to the construction of essentially similar tests. These objectives should

relate to some later role situation. The content validity of the test situation is a function of those role descriptive characteristics that affect the required performances in the role situation. Such characteristics are identified during the development of task descriptions. The various classes of task descriptions are related to the design of instructional testing procedures and instructional communication.

Whitmore, Paul G. "Deriving and Specifying Instructional Objectives." Paper read at Symposium on Automated Teaching: Research Problem, Meeting of American Psychological Association, September, 1961, pp. 13.

Discussion of the following stages related to the student's need to perform: (1) identifying terminal behavior that the student needs to perform; (2) identifying transitional and supporting associations, and the organization of the terminal behaviors into optimum practice units arranged in some optimum sequence; and (3) the design and arrangement of instructional situations.

Whitmore, Paul G. "A Rational Analysis of the Process of Instruction." IRE Transaction on Education, December, 1961, pp. 135-143.

Definition of instruction as a process for controlling student behavior so as to insure learning, and of learning as behavioral associationism. These definitions were applied to the problem of: (1) identifying what is to be learned; (2) sequencing the order in which instructional materials are to be presented, and (3) designing instructional situations for accomplishing learning. Evaluation consists of two major processes: (1) evaluation of the effectiveness of the instruction process for inculcating desired behavior on students, and (2) evaluation of the selected behaviors in terms of producing adequate job performance.

Wildman, Peggy R. "The Fallacy of Facts," Peabody Journal of Education, Vol. 44, November, 1966, pp. 177-80.

The teaching of cold facts is attacked while the solution to this dilemma proves to be well modeled in Taxonomy of Educational Objectives, The Classification of Educational Goals (Bloom, Benjamin S.). The six classifications of objectives begin at the lowest level of learning and move to the apex of the cognitive domain. The six classifications of objectives presented are knowledge, comprehension, application, analysis, synthesis and evaluation. The objectives are meant to revolutionize teaching techniques and will steer both student and teacher away from solely cold facts into more creative learning and problem solving.

Wise, Lew E. "Stop Teaching Biology," Education Digest, Vol. 32, October, 1966, pp. 52-54.

This is a call to stop the teaching of biology as a "collection of facts or truths" and to develop more creativity in students. The objectives of this type of biology are presented along the lines of a more sophisticated, abstract ideal. There is a brief explanation of how biology should be taught with special emphasis on the laboratory. The paper gives an individual insight into the handling of a general biology course and many ideals on the way to goal fulfillment.

Woodruff, Asahel D. "Teacher Education: Current Developments and New Directions," Classroom Interaction Newsletter, Temple University, Vol. 1, No. 2, May, 1966, pp. 3-5.

Seven components are listed in support of the thesis that developing curriculum is a task designed to permit the teacher to specify her instructional intent and through this specification make possible a more definitive model for the learning process. A model is presented for joint planning of curriculum and an articulated teacher education program with a detailed description of the model via the seven components mentioned above. For example, Component No. 1 suggests that the first consideration in curriculum development is to state the major objectives in the form of behaviors to be produced by the learner.